Siren and Lights Interface Module

Installation Manual

Foreword

This manual covers the Siren and Lights Interface Module Installation for ASTRO® APX™ 6500/ APX 7500 mobile radios. It includes all the information necessary to install mid power and high power radios, and configure radio installation inside vehicles.

Manual Revisions

Changes which occur after this manual is printed are described in PMRs (Publication Manual Revisions). These PMRs provide complete replacement pages for all added, changed, and deleted items.
To obtain PMRs, go to http://www.motorolasolutions.com.

Parts Ordering

See Appendix A: Ordering Information for information on how to obtain replacement parts. For part numbers, refer to the ASTRO APX Mobile Radio Basic Service Manual (Motorola publication part number 6875964M01).

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Document History

The following major changes have been implemented in this manual since the previous edition:

Edition	Description	Date
MN001184A01-A	Initial Release	Nov. 2014

Notes

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Limited Warranty

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Notes

Chapter 1 Introduction

This manual covers the installation procedures for the Siren and Light Interface Module, hereafter to be referred as the Module. The Module is a translation device that enables a Motorola APX 6500/ APX 6500Li/APX 7500 mobile radio to interact with third party emergency light and siren controllers.

1.1 Mobile Radio Description

1.1.1 Minimum Requirements

Table 1-1 Minimum Requirement

Items	Requirement
Mobile Radio	• Motorola APX 6500, Motorola APX 6500Li, or Motorola APX 7500
Radio Control Head	• Motorola O3, O7, O9
Mobile Radio Firmware	• Motorola SW 7.13.5 or higher
Mobile Radio TIB	• PMUN1058_ or newer (mid power) • PMUN1059_ or newer (high power)
Light and Siren Controller	• Refer to Appendix A for list of compatible light and siren controllers
Module Programming	• Windows XP, Windows 7 or Windows 8 PC with USB port

1.1.2 Specifications

Table 1-2 Specifications

General	
Input Voltage	• 13.8 VDC +/- 20%
Main Input Fuse	• 2 A
Typical Power Consumption	• < 200 mA
Operating Temperature	• -30 C to +70 C
Storage Temperature	• -40 C to +85 C
Reverse Polarity	• Protected
Dimensions	
Height	• 2.11”
Width	• 7.94”
Depth	• 3.31”
GPIO	
Max Input Sink Current	• 100 mA

Notes

Chapter 2 Pre-Installation and Configuration

2.1 Introduction

The Module acts as a translator between a Motorola APX mobile radio and third-party light & siren controllers. The Module enables users to control their devices with a standard APX mobile radio control head such as the O3, O7, or O9. The Module's Programming Utility allows a technician to configure the Module to work with the devices connected and to define how they will interact with each other. A Module must be configured by the Programming Utility before it can function properly.

This guide will provide the details necessary to properly setup the Module for use with compatible hardware. Separately from configuring the Module, it is also necessary to properly prepare the radio to accept external control. It is also necessary to configure the third-party siren & light controller to perform its desired functionality. The user of the Programming Utility should therefore be experienced with the configuration and use of all devices connected to the Module.

2.2 Radio Preparation

Before configuring the Module, first ensure compatible radio hardware is used. The mobile radio must utilize a compatible TIB to support integration with the Module. If needed, the TIB can be upgraded to a compatible version, for more information see the radio installation guide. Second, ensure the radio is using software SR 7.13.5 or higher. Third, the radio must be programmed through the CPS to allow external control.

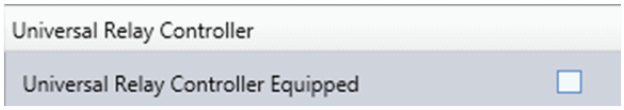
2.2.1 CPS Configuration

Before configuring the Module, the radio should be programmed to allow control-head buttons and functions to be monitored and controlled by third-party devices. If the radio is not programmed correctly, the Module will not be able to interface with the radio properly.

2.2.1.1 Disable the Universal Relay Controller

When the Module is integrated with a radio, a URC will not be used. It is important to disable the URC functionality in the radio or it may interfere with control head display indicators. To disable the URC option in the radio, open the CPS, select Radio Wide from the left menu and then select Universal Relay Controller to open the settings page. Ensure that the option Universal Relay Controller Equipped is not checked.

Radio Wide > Universal Relay Controller > Universal Relay Controller Equipped > **Not** Checked



2.2.1.2 Set Buttons as Third Party

In order for the Siren and Light Interface Module to work with radio buttons, the buttons must be programmed to allow third party control. Each individual button which will be controlled by the Siren and Light Interface module must first have its feature set as "Third Party". Carefully consider which buttons should be managed by the radio to perform standard radio functions and which buttons should be managed by the Siren and Light Interface Module to be mapped to an external light and siren controller.

Only certain buttons are Third Party capable. Buttons which are not Third Party capable cannot be used with the Module to control siren & light functions. There are five locations in the CPS where Third Party capable buttons may be programmed depending on the type or location of the button. The five classifications of buttons are Control-Head buttons, Keypad buttons, Keypad Mic buttons, DEK buttons, and Action Consolidations.

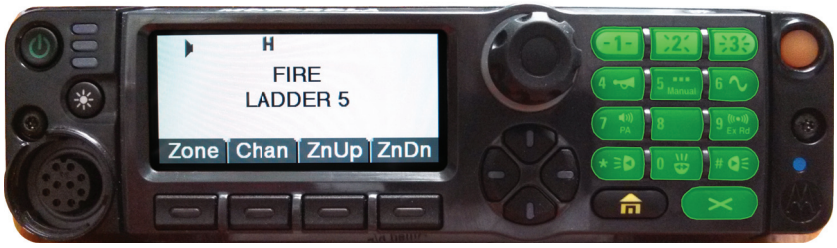
2.2.1.2.1 Control Head Buttons

Use the CPS to program control-head buttons and set their feature to “Third Party”. For example, open the CPS, from the left menu open the Radio Ergonomics Configuration submenu, open the Controls submenu, select Control Head - <desired head>, and then for each desired button set the button’s feature to “Third Party”. If using Top Function Programmable Buttons on the O9 it may be desirable to also set appropriate labels in the display. See the image below to identify third-party capable buttons.

Radio Ergonomics Configuration > Controls > Control Head - XX > Set Button’s Feature

NOTE Keypad buttons are shared across all keypad devices and are programmed in a separate section of the CPS software.

MOTOROLA
MUTUAL AID
HOSPITAL
Zone Chan ZnUp
VOL
MODE


FIRE
LADDER 5
Zone Chan ZnUp ZnDn

Manual
PA
MOTOROLA
Left Arrow
Right Arrow
Flash
POLICE
SWAT TEAM
Zone Channel ZoneUp ZoneDn
P1 P2 P3 P4 P5

2.2.1.2.2 Keypad Buttons

Use the CPS to program keypad buttons and set their feature to “Third Party”. For example, open the CPS, from the left menu open the Radio Ergonomics Configuration submenu, open the Controls submenu, select Keypad, and then for each desired button set the button’s feature to “Third Party”. Note that keypad buttons are the same across all radio devices. For example, if using a keypad mic and a radio control-head with a keypad both sets of buttons will be identical. This standard radio functionality is not altered by the Module.

Radio Ergonomics Configuration > Controls > Keypad > Set Button’s Feature

2.2.1.2.3 Keypad Mic

Use the CPS to program keypad mic buttons and set their feature to “Third Party”. For example, open the CPS, from the left menu open the Radio Ergonomics Configuration submenu, open the Controls submenu, select Keypad Mic And Accessories, and then for each desired button set the button’s feature to “Third Party”. Note that keypad buttons are the same across all radio devices and are programmed in the Keypad options page. See the image below to identify third-party capable buttons.

Radio Ergonomics Configuration > Controls > Keypad Mic And Accessories> Set Button’s Feature

2.2.1.2.4 DEK's

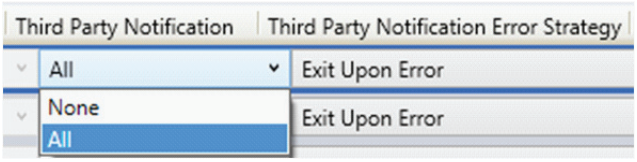
Use the CPS to program DEK buttons as one normally would but set their feature to "Third Party". For example, open the CPS, from the left menu, open the Radio Ergonomics Configuration submenu, open the Controls submenu, select DEK, and then for each desired button set the button's feature to "Third Party". See the image below to identify third-party capable buttons.

Radio Ergonomics Configuration > Controls > DEK > Set Button's Feature

2.2.1.2.5 Action Consolidation

If a button (or switch position) is set for action consolidation, and will also be used with the Module, then the button (or switch position) must first be set for Third Party Notification. To do this, use the CPS to program the Action Consolidation buttons (or switch positions) as one normally would. Then, make sure the Third Party Notification setting is set to "All". For example, open the CPS, from the left menu open the Radio Ergonomics Configuration submenu, select Action Consolidation and for each action which will be used with the Module set third party notification to "All".

Radio Ergonomics Configuration > Action Consolidation > Set Third Party Notification



If a consolidated action will be set to perform one or more CPS defined actions and also will be used with the Module then be sure to consider setting a desired Third Party Notification Error Strategy. If for any reason there were a problem sending an action notification to the Module, the error strategy setting will determine whether the other defined actions are carried out or if the consolidated action will exit without completing all of the other defined actions. If the consolidated action does not contain multiple actions, and is only being used with the Siren and Light Interface Module, then the Third Party Notification Error Strategy setting will not matter. For more information on this setting consult the radio user manual or CPS help guides.

2.3 Lights & Siren Preparation

To integrate a Module with a siren & light controller, certain requirements must be met. The siren & light controller must be compatible with the Module and any required OEM interface hardware must be obtained. For more information on siren compatibility and OEM siren interface hardware please refer to Appendix A. The last requirement is that the siren & light controller is correctly programmed.

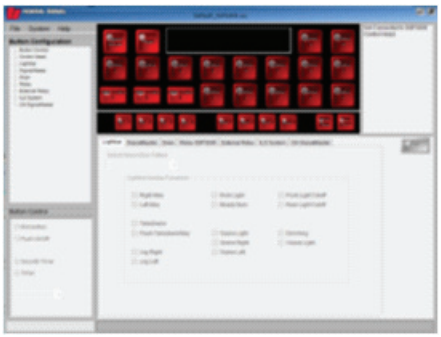
Siren & light equipment must be fully programmed according to the normal OEM installation procedure. The equipment must be in a fully configured and operational state prior to integration with the Module and radio. The programming of the OEM siren equipment will determine the options available for control through the Module or radio control head. In other words, if a feature is not programmed and available when using the siren's OEM control head, then the feature will similarly not be available on any other integrated device.

The type of button (momentary, latching, multi-state) is set in the siren programming. The Module cannot change the button type of a siren feature so time should be taken to setup the siren carefully while noting the functionality and type of each button durring programming. This information will need to be configured in the Module to allow for correct control and user feedback.

Ensure the siren equipment is programmed to meet the needs and desires of the end user according to the typical OEM installation and programming procedure for the Siren & Light equipment used. The siren should be programmed as-if it were to be installed without interfacing to any other device. For more details on this procedure refer to the OEM equipment manufacturer's product documentation.

NOTE The Module allows buttons to be mapped from a radio device to the siren's control head. When a configured button is pressed on a radio device, the Module will "virtually" press the siren button mapped in the Module's configuration. The siren equipment will then interpret the button press and carry out whichever feature or action it is programmed to do. The Module cannot directly control siren features and does not natively know how the siren is programmed. It is up to the user to configure the Module correctly to match the siren programming.

Example OEM configuration software shown below:

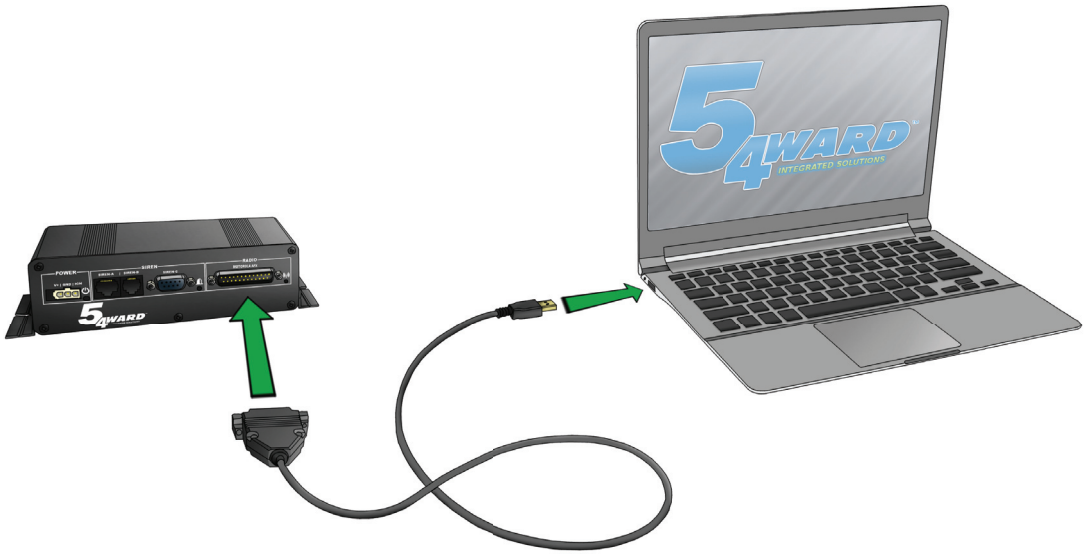


2.4 Connecting the Module to a PC

2.4.1 Connect the Programming Cable

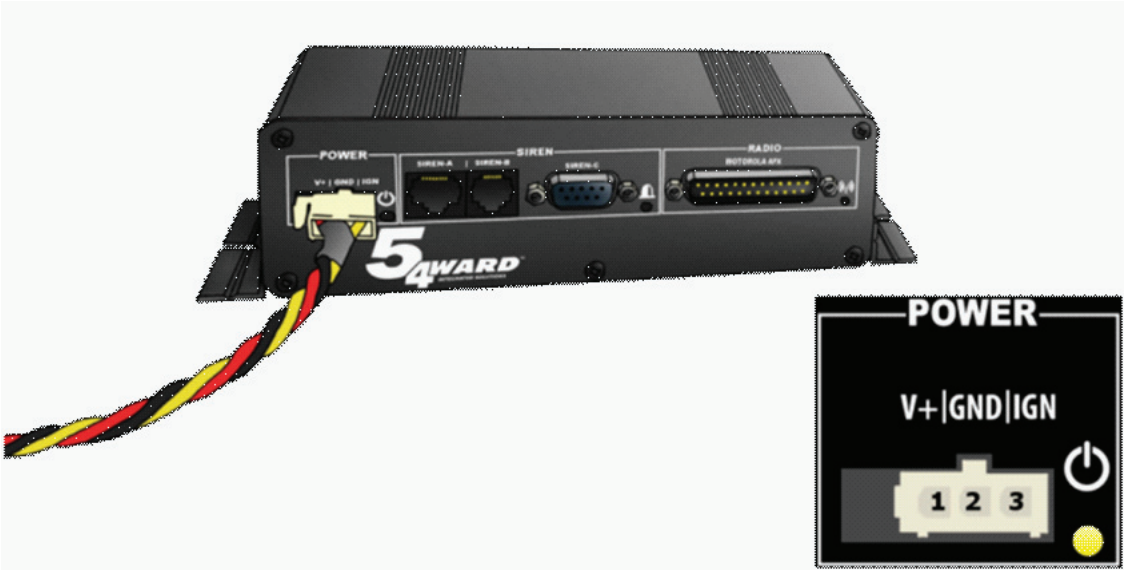
The module is programmed via its 25-pin “RADIO/PROGRAM” port. Using the Module’s programming cable (included in kit: TT05889AA) connect the Module to a PC. The PC should already have the Siren & Light Interface Module Programming Utility and Driver installed.

NOTE The Module should not be connected to power until **after** the programming cable is connected.



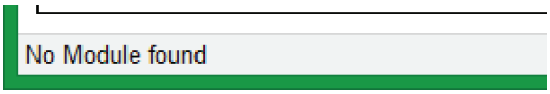
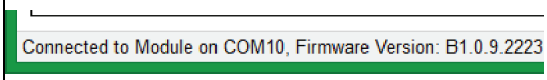
2.4.2 Power the Module

After connecting the programming cable, power up the Module. Connect the Module's power harness to a 12V DC or compatible power source, and then connect the power harness to the Module. The V+ (red) and Ignition (yellow) leads will both need to be connected to the same positive voltage source during programming to ensure the Module is powered on. Please refer to the Section 3.4: "Wiring" on page 3-2 for additional wiring details.



2.4.3 Programming Utility

Open the Module's Programming Utility on the PC that the Module is connected to. When properly connected, a successful status message will be displayed in the lower left corner of the utility. If the module is not connected properly, an error message will be displayed in the lower left corner of the utility.

No Connection	Successful Connection
	

2.5 Module Configuration

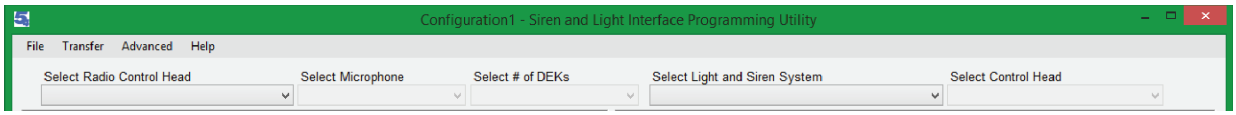
The Programming Utility is used to configure the Module for use with connected devices. It enables the user to specify which devices are connected, how the devices are programmed, and how those devices will interact with the radio and accessories.

2.5.1 General Navigation

The Configuration Utility consists of two main screens. The first screen displayed after opening the utility is the Modify Devices screen. From here a user identifies the specific equipment and accessories used in their specific setup. These selections determine the options available to the user. The second screen shown after the user has selected their equipment is the Map Actions screen. From here the user is able to setup action connections between devices and customize options available based on their equipment.

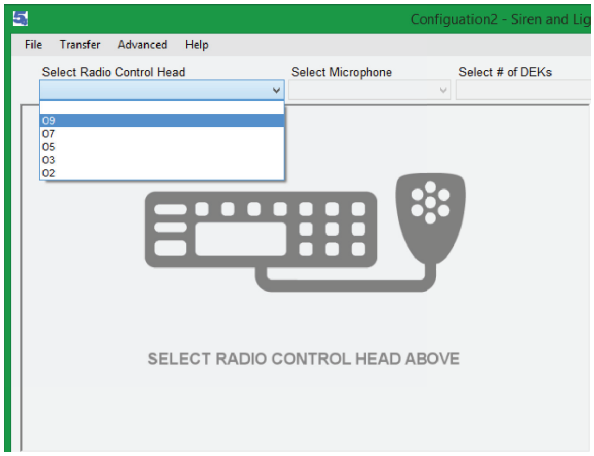
2.5.1.1 Modify Devices Screen

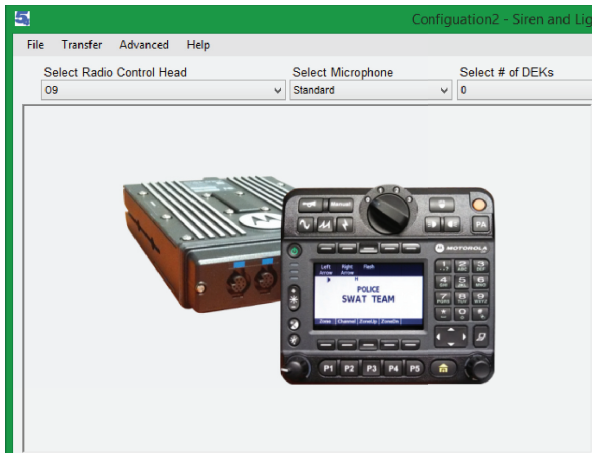
The Modify Devices screen is the starting point for setting up a new Module configuration. Before the Module can be configured, the hardware must be identified. The top row of the Programming Utility contains several drop-down boxes which are used to select the particular equipment the Module will interface with. Note that some of the drop-down boxes will be greyed-out and unavailable until other selections are made.



2.5.1.1.1 Selecting A Radio Control Head

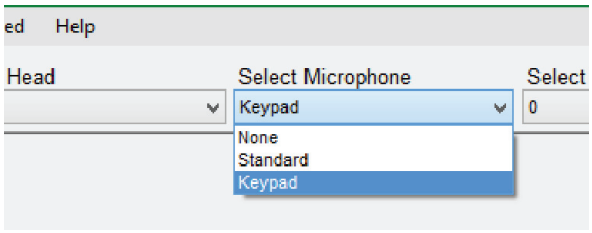
Selecting a radio control head is the first step to configuring radio hardware. Once the radio control head is selected the other radio drop-down boxes will be available for selection and an image of the control head will be displayed in the left pane of the screen for verification purposes. Additionally, the bottom information pane will be updated to show useful information about the radio hardware.





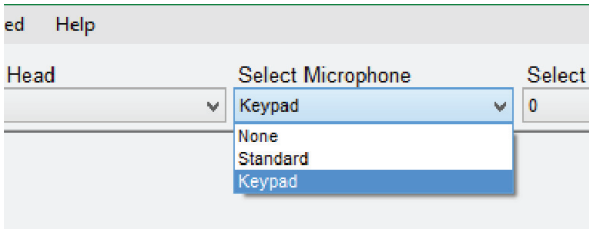
2.5.1.1.2 Selecting A Microphone

The drop-down for selecting a microphone will be available once the radio control head is selected. Setting the microphone will not change the radio image displayed in the left pane of the screen. The different microphones available may impact the options available in the Map Actions screen. It is important to select the correct equipment.



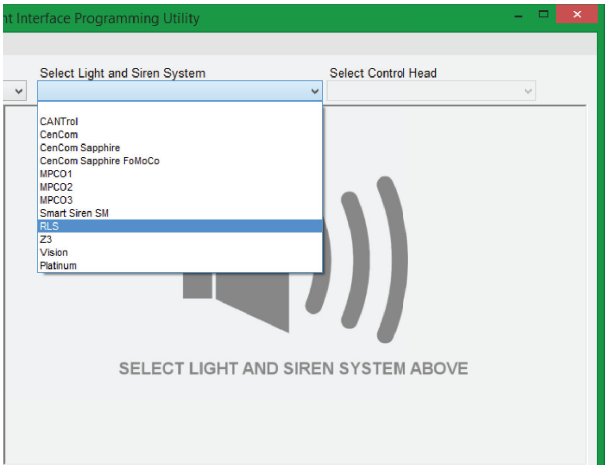
2.5.1.1.3 Selecting DEKs

The drop-down box for selecting the number of DEKs will be available once the radio control head is selected. Setting the number of DEKs will not change the radio image displayed in the left pane of the screen. The number of DEKs available may impact the options available in the Map Actions screen. It is important to select the correct equipment.



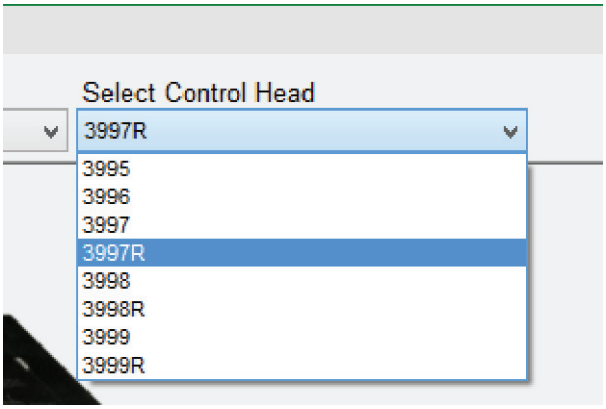
2.5.1.1.4 Selecting A Siren And Control Head

Selecting a light & siren controller is a critical step in configuring the Module. Once the light & siren controller is selected the Control Head drop-down box will be available for selection and an image of the light & siren system will be displayed in the right pane of the screen for verification purposes. Additionally, the bottom information pane will be updated to show useful information about the siren.



2.5.1.1.5 Selecting A Siren Control Head

Depending on the siren & light controller selected, there may or may not be multiple control head options. The drop down box for selecting the Control Head will be available once the light and siren controller is selected. Setting the control head will not change the light and siren controller image displayed in the right pane of this screen. The correct image will be displayed on the Map Actions screen where it may be used for reference. The selection of a control head may impact the options available in the Map Actions screen. It is important to select the correct equipment.



2.5.1.1.6 Navigation Buttons

The Modify Devices screen contains two large buttons: Read Module and Map Actions.

The Read Module button allows a user to import an existing configuration from a module. Reading a module's configuration will auto populate settings in the Modify Devices screen as well as the Map Actions screen with settings from a connected Module. Any previously selected options will be ignored and overwritten by the configuration read from the Module.

The Map Actions button is used after making equipment selections to get to the Map Actions screen. When making or modifying a configuration, once the equipment selections are made the Map Actions button must be pressed to continue with the configuration process. If the read module button is pressed, the utility will automatically enter the map actions screen to auto populate the remainder of the configuration.

2.5.1.2 Map Actions Screen

The Map Actions screen is where the Module configuration truly takes place. It is here that the interaction between devices is defined. The screen is divided into a few key sections. The top of the screen shows all of the selected devices from the Modify Devices screen. Navigation buttons reside in the middle, and the configuration table is shown toward the bottom of the screen.

2.5.1.2.1 Identifying Inputs

The top left pane of the screen shows those devices selected from the Modify Devices screen which can act as inputs to the Module. The pane can display up to four devices: a radio control head, a radio microphone, a radio DEK, and the Module general purpose inputs & outputs (GPIO). Only relevant devices will be shown so depending on the selections made, some devices may not be shown. The buttons and inputs eligible for integration with the Module are labeled with letters or numbers for identification purposes. Carefully review the images and compare them to the equipment used in the vehicle to understand the button labeling.

The labeling on each device's image is used to identify the button in the configuration. Generally, the labels are specific to the piece of hardware. For example, "A" on the O9 control head is unique and separate from "A" on the DEK, or from "A" on the keypad mic. These input buttons are unique on each device or accessory. However, the numeric keypad is not unique between devices. The number "1" on the O9 control head is the same number "1" on the keypad mic. This is a feature of the radio. Users familiar with the radio CPS are already familiar with the shared keypad functionality.

The GPIO pins are located on the physical GPIO port of the Module. There are four dedicated inputs and four dedicated outputs. The inputs are treated the same as any other button but are ground activated rather than being physically pressed. For electrical information refer to Section 3.4.5: "General Purpose Inputs & Outputs (GPIO)" on page 3-5.

2.5.1.2.2 Identifying Outputs

The top right pane of the screen shows the siren control head selected from the Modify Devices screen. The control head represents buttons or functions which can be set as outputs from the Module. Carefully review the image and compare it to the equipment used in the vehicle to understand the button labeling.

The GPIO pins are located on the physical GPIO port of the Module. There are four dedicated inputs and four dedicated outputs. The outputs provide a path to ground for low current devices when the output is activated. For electrical information refer to Section 3.4.5: “General Purpose Inputs & Outputs (GPIO)” on page 3-5.

There is one additional output which is not represented visually – Public Address (PA). The Module is capable of taking audio from the radio microphone and outputting it to the light & siren controller for amplification and output to a siren speaker. The radio and Module do not output PA audio by default. PA audio is an additional output which can be enabled by the Module.

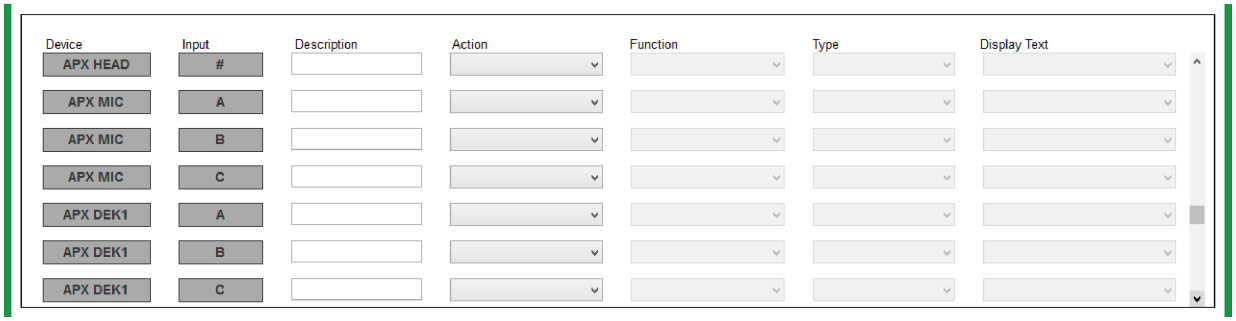
2.5.1.2.3 Identifying Input And Output Connections

The most important part of configuring the Module is deciding how it should be configured. This depends on the wants and needs of the user as well as the limitations of the equipment used. Both the radio and the siren & light controller should already have been programmed in preparation for use with the Module. Time should be spent to carefully plan out the desired connections between the inputs and outputs.

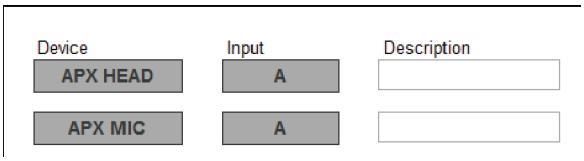
The module works by virtually mapping input buttons to output buttons. This allows, for example, a radio control head button to be used to simulate pressing a siren control head button. When fully integrated, the radio control head would then be able to control a siren feature which was previously only available on the siren’s OEM control head.

2.5.1.2.4 Mapping The Configuration Table

The bottom of the Map Actions screen shows the Modules configuration table. This is where the actual configuration between devices is defined. There is one row in the table for each input. An input can be a button from a radio device or a GPIO input. When the Module detects the activation of any input it will perform the actions specified (if any) in the configuration row for that input.



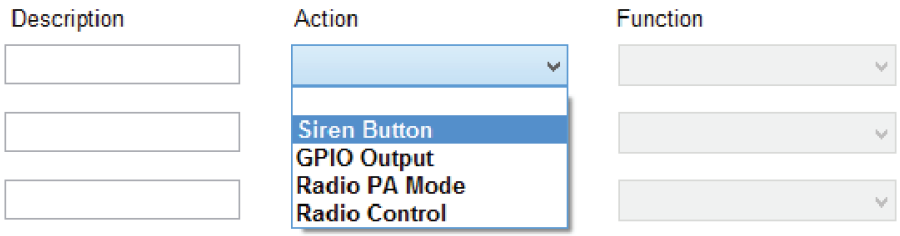
The **Device** column indicates the physical device that the input is from. The device label will match one of the devices shown in the top left input panel diagrams. The device label is most helpful when two or more devices share similar input names.



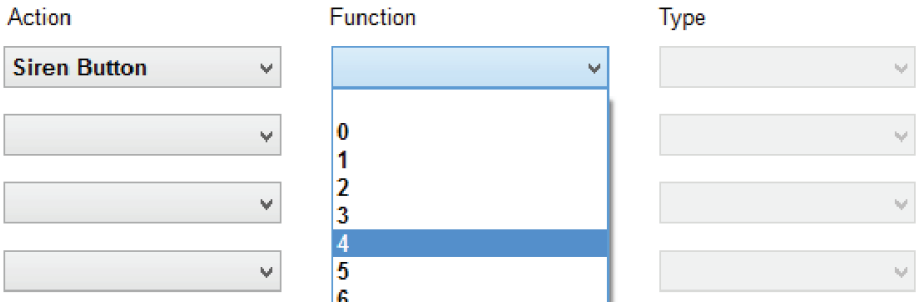
The **Input** column indicates the name or label of the input. The label will match the ones shown in the top left input panel diagrams. Together, any row can be exactly identified and associated with a physical location.

The **Description** column is a text box allowing a user to type a custom name or meaningful note to help identify configurations.

The **Action** column is a drop-down box that defines the general type of output action to take. Some inputs can be mapped to a siren button, a GPIO output, to toggle PA audio from the radio, or to a radio control function.

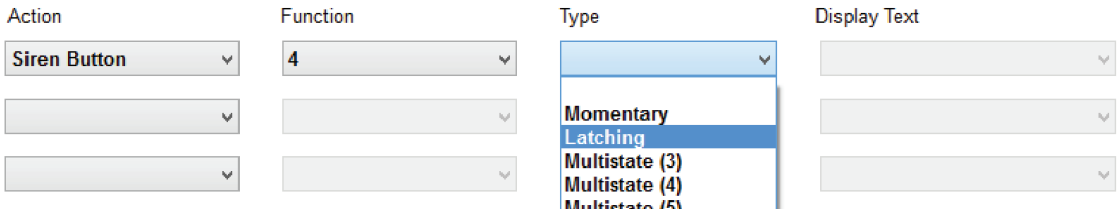


The **Function** column is a drop-down box that defines the specific function an input should be mapped to. The options shown in the list of functions will change based on the Action selected. For example, if an input's action was set to be a siren button, the function would define which specific siren button it was mapped to. If the input's action was set to a GPIO output, the function would define which specific GPIO output it was mapped to. If the input's action was set to radio control, the function would define which specific radio function to control.



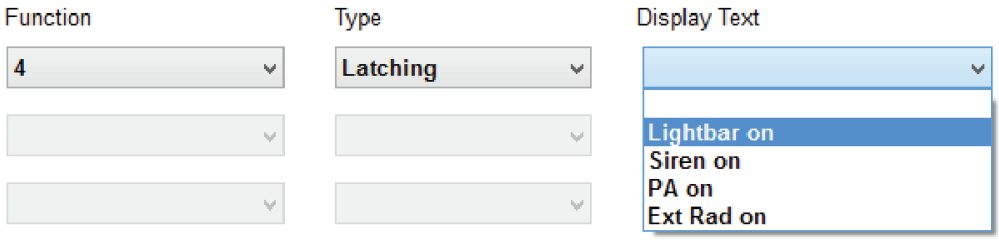
If the input's action was set to toggle PA audio from the radio – then the function column may or may not bet set. Radio PA is a special case, no function is necessary to toggle the radio mode or to get the Module to output audio to the light & siren controller. However, some users may have siren equipment programmed with a special PA mode and if it is desired, the Module can also activate the appropriate siren button to toggle that mode simultaneously. The function list for PA will allow an optional siren button to be activated along with radio PA in the event that it is necessary and desired to put both devices into a PA mode. It is typically the case that this optional siren mode is not required even when the feature is present on the siren. It is left up to the user to decide how to implement PA.

The **Type** column is a drop-down box that defines the type of button pressing activation to use. This field tells the Module how to communicate with the desired output. The button type must match the type used by the output device. For example, if the input in question is set to activate siren button 10, then the button type drop-down box in the configuration must match the type of siren button 10. If there is a mismatch of button types between the Module and output device then unexpected results will occur.



The basic button types include Momentary, Latching, and Multi-state. A momentary button is only active while it is being pressed (and held). As soon as the button is released, the action associated with the button stops. A latching button is active when it is pressed and remains active until it is pressed a second time. A multi-state button is active when pressed to perform one function, and then changes when pressed again to perform another function. Put another way, it cycles. Multi-state buttons have various number of states, in the Module configuration the number of states is shown in parenthesis. Off is counted as a state.

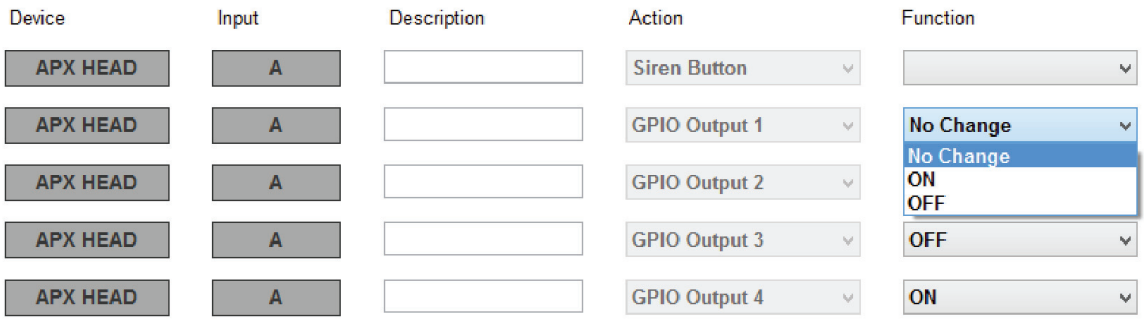
The **Display Text** column is an optional drop-down box that defines the text shown (if any) on the radio control head to indicate to the user that a function is active. The display text should match the type of feature enabled. For example, if an input is set to enable siren button 4, and siren button 4 happens to enable a siren relay, and the relay happens to be connected to an external vehicle Lightbar then the display text should probably be set to “Lightbar On” to alert the user that lights are currently activated.



2.5.1.2.5 Action Consolidation

Action consolidation is when one input triggers multiple outputs or actions. Users familiar with the radio may already be aware that the radio supports action consolidation on some control head and mic buttons. Those buttons are indicated in the utility by green button labels. Buttons which are shown as half green & half white can be set as action consolidation buttons in the radio but can also be used as traditional buttons.

Separately from the radio, the Module also supports action consolidation for O9 slide switch positions. The additional actions are limited to GPIO outputs and show up in the configuration table as multiple rows with the same deice and input. The additional rows for GPIO outputs can be set to activate (on), deactivate (off), or to not affect (no change) the individual GPIO outputs in addition to any siren button functions enabled. By default, the outputs will not be changed.

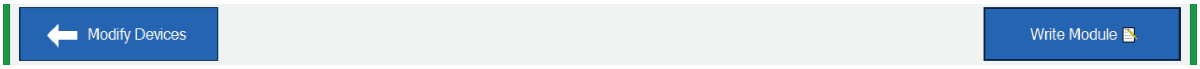


2.5.1.2.6 Navigation Buttons

The Map Actions screen contains two large buttons: Modify Devices, and Write Module.

The Modify Devices button leaves the Map Actions screen and re-displays the Modify Devices screen. This allows a user to go back to update their hardware selections. Note that selecting new hardware may erase existing configurations entries in the Map Actions table.

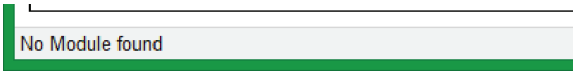
The Write Module button sends the active configuration from the utility to the Module.

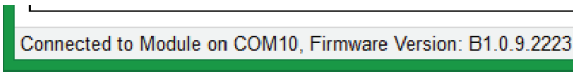


2.5.1.3 Status Line

The bottom line of the programming utility is the status line. It is used to display messages to the user for key events.

The left side of the status line is used for connection messages. The utility automatically detects the connection or disconnections of a compatible Module. When a Module is connected the utility attempts to read and then display the current firmware version. Example connection messages are shown below:





The right side of the status line is used for read, write, and programming messages. The utility will briefly display a confirmation or failure message when a read or write operation takes place. Example read or write messages are displayed below:

2.5.1.4 Menu Options

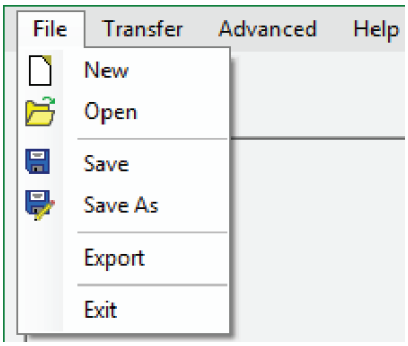
2.5.1.4.1 File Menu

The **New** menu option allows a user to close or erase any existing configuration settings and start from a blank configuration.

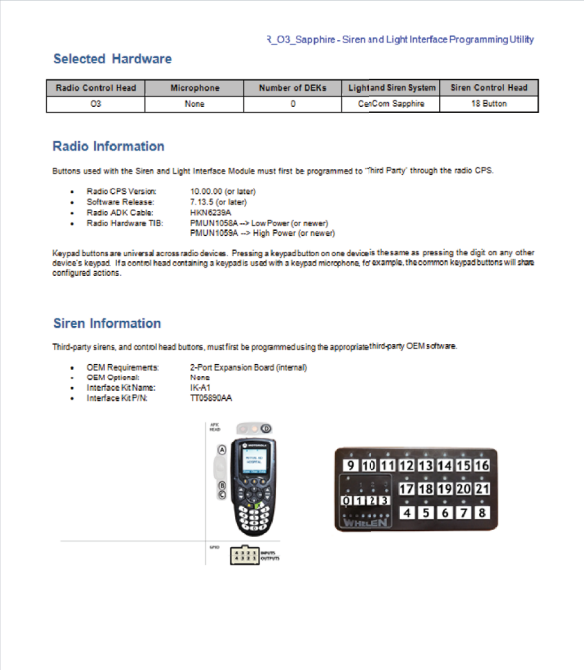
The **Open** menu option allows a user to open a configuration file saved on their PC.

The **Save** menu option allows a user to save changes made to a configuration onto their PC. If the configuration is already associated with a file because it was recently opened or has already been saved then the menu option will automatically update the associated file. If, however, a new configuration is being saved which is not yet been associated with any file then the utility will prompt the user for a file name and save location.

The **Save As** menu option allows a user to save changed made to a configuration and prompts the user for a file name and save location even if the configuration was previously associated with another file.



The **Export** menu option allows a user to output a configuration in a user-readable format. The export feature can create a Microsoft Word document containing the hardware selections as well as the associated images for the selected hardware and all of the configuration table entries. Note: in order to use the export menu option to output a Microsoft Word file, the user's PC must have Microsoft Word installed.



3_O3_Sapphire - Siren and Light Interface Programming Utility

Selected Hardware

Radio Control Head	Microphone	Number of DEKs	Lightand Siren System	Siren Control Head
O3	None	0	CenCom Sapphire	18 Button

Radio Information

Buttons used with the Siren and Light Interface Module must first be programmed to "third Party' through the radio CPS.

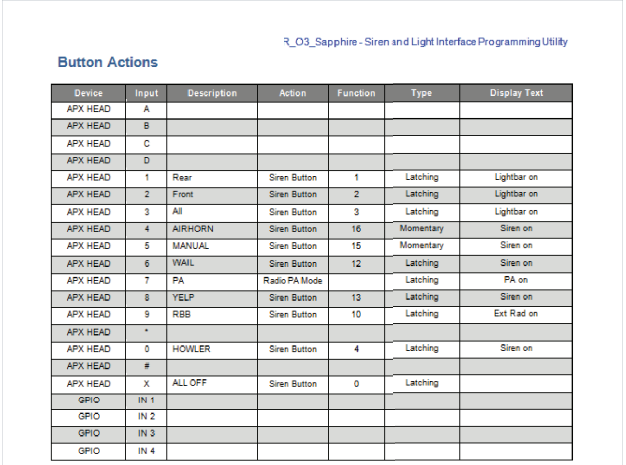
- Radio CPS Version: 10.00.00 (or later)
- Software Release: 7.13.5 (or later)
- Radio ADK Cable: HKN6239A
- Radio Hardware TIB: PMUN1058A --> Low Power (or newer) PMUN1059A --> High Power (or newer)

Keypad buttons are universal across radio devices. Pressing a keypad button on one device is the same as pressing the digit on any other device's keypad. If a control head containing a keypad is used with a keypad microphone, for example, the common keypad buttons will share configured actions.

Siren Information

Third-party sirens, and control head buttons, must first be programmed using the appropriate third-party OEM software.

- OEM Requirements: 2-Port Expansion Board (internal)
- OEM Optional: None
- Interface Kit Name: IK-A1
- Interface Kit P/N: TT05890AA



3_O3_Sapphire - Siren and Light Interface Programming Utility

Button Actions

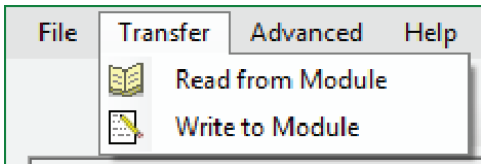
Device	Input	Description	Action	Function	Type	Display Text
APX HEAD	A					
APX HEAD	B					
APX HEAD	C					
APX HEAD	D					
APX HEAD	1	Rear	Siren Button	1	Latching	Lightbar on
APX HEAD	2	Front	Siren Button	2	Latching	Lightbar on
APX HEAD	3	All	Siren Button	3	Latching	Lightbar on
APX HEAD	4	AIRHORN	Siren Button	16	Momentary	Siren on
APX HEAD	5	MANUAL	Siren Button	15	Momentary	Siren on
APX HEAD	6	WAIL	Siren Button	12	Latching	Siren on
APX HEAD	7	PA	Radio PA Mode		Latching	PA on
APX HEAD	8	YELP	Siren Button	13	Latching	Siren on
APX HEAD	9	RBB	Siren Button	10	Latching	Ext Rad on
APX HEAD	*					
APX HEAD	0	HOWLER	Siren Button	4	Latching	Siren on
APX HEAD	#					
APX HEAD	X	ALL OFF	Siren Button	0	Latching	
GPIO	IN 1					
GPIO	IN 2					
GPIO	IN 3					
GPIO	IN 4					

The **Exit** menu option closes the programming utility.

2.5.1.4.2 Transfer Menu

The Read from Module menu option allows the user to read an existing configuration from a connected Module and auto populate the settings into the utility. This option is similar to the Read Module button on the Modify Devices screen but is available at any time through the menu. Reading a configuration will erase and overwrite any settings or options currently selected.

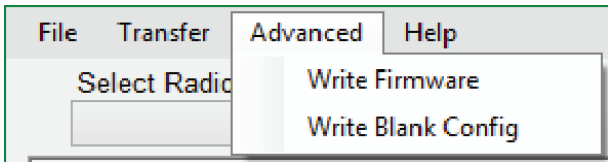
The Write to Module menu option allows the user to write the currently open configuration to a connected Module. The option is similar to the Write Module button on the Map Action screen but is available at any time through the menu.



2.5.1.4.3 Advanced Menu

The **Write Firmware** menu option allows a user to re-flash a connected Module's firmware. This option can be used to upgrade a Module to a new firmware version if the user has an upgraded firmware to flash. When selected, the user will be prompted for a firmware file. Note that firmware files and configuration files are different – the Write Firmware function cannot be used to update a Module's configuration.

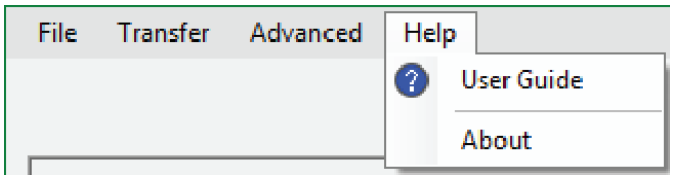
The **Write Blank Configuration** menu option allows a user to essentially erase the configuration memory of a Module. The use of this feature is not encouraged unless requested by a support technician. There is no need to erase a configuration before updating or re-writing a new configuration.



2.5.1.4.4 Help Menu

The **User Guide** menu option allows a user to load the Module's user guide (this manual).

The **About** menu option allows a user to view information about the programming utility such as the software version.



Chapter 3 Installation

3.1 Installation Overview

This document provides the necessary information to safely, and properly install the product. Before continuing with installation, be sure to read this manual completely. It contains important information that could prevent damage to equipment or serious injury.

WARNING

Sirens output audio at extremely loud amplitudes. Exposure to extreme volume audio without adequate hearing protection can cause pain and/or hearing loss. The Occupational Safety & Health Administration organization (www.osha.gov) provides information to determine safe exposure limits for work environments. Until you have determined the safe exposure times for your specific application, anyone in the immediate vicinity should be required to wear an approved hearing protection device. Failure to comply with this warning could result in serious injury, damage to or loss of hearing.

Caution

• The installation technician should have experience working with automotive electronics and general knowledge of safety procedures related to such systems..

• If a butt connector or splice may be exposed to moisture then waterproof connectors must be utilized.

• Failure to follow the installation procedure will void the product warranty.

• If installation of this product requires holes to be drilled, the technician must check both sides of the surface to be drilled to ensure there are no sensitive vehicle components, electrical wires, or fluid lines near the proposed drilling location. Holes and edges must have burs removed prior to installation. If wire or cables are to be run through any drilled hole then a grommet must be used for protection from sharp or rough surfaces.

• The product and associated wires, cables, or accessories must not be installed in the deployment area of any vehicle air bags. Improper installation may prevent proper functionality of the air bag deployment or result in the product becoming a projectile. Failure to follow this instruction may result in serious injury. The installation technician assumes full responsibility in determining a safe mounting location. Refer to your vehicle owner's manual for the air bag deployment area.

3.2 Installation Basics

1. Use the Motorola CPS software to program those buttons on the APX control head which are desired for interaction with the Module. Please refer to Section 2.2.1: “CPS Configuration” on page 2-1.
2. Program the light and siren controller as if you were using the manufacturer’s provided control head using the manufacturer’s traditional method.
3. Configure the Module using the configuration utility. Please refer to the Section 2.5: “Module Configuration” on page 2-10 for details.
4. Physically install the Module and connect to configured devices.

3.3 Mounting

1. Locate a suitable mounting location. A dry, cool compartment is required.
2. Position the Module on the proposed mounting location. Using an awl or similar tool, scribe the mounting surface where the mounting holes are to be drilled. Make sure that this mounting area allows sufficient ventilation for the Module.

•Mounting the Module will require drilling, therefore it is absolutely necessary to make sure that no other vehicle components could be damaged in the process. Check both sides of the mounting surface before starting. If damage is likely, select a different mounting location.

3. Remove the Module from its mounting area, and using a drill bit sized for a no.10 sheet metal screw, drill a hole in each of the areas scribed in the previous step.
4. Return the Module to its mounting location and using customer provided screws, secure the Module onto its mounting surface. The use of lock washers is highly recommended. Install a lock washer onto each mounting screw before mounting the unit.

IMPORTANT-> The Module case must be either mounted on, or grounded to the vehicle chassis.

3.4 Wiring

3.4.1 General

All customer supplied wires that connect to the positive terminal of the battery must be 18AWG or larger, have sufficient insulation, adequately support the environment of the vehicle, and be fused at the battery. Do not use circuit breakers with this product.

IMPORTANT-> Wires connecting to the SLIM power harness and GPIO port have the proper terminals pre-installed. If the customer needs to re-terminate these wires for any reason, the proper tool must be used to insure proper crimping.

3.4.2 System Power

1. Locate the Power Harness (Motorola P/N TT05887AA).

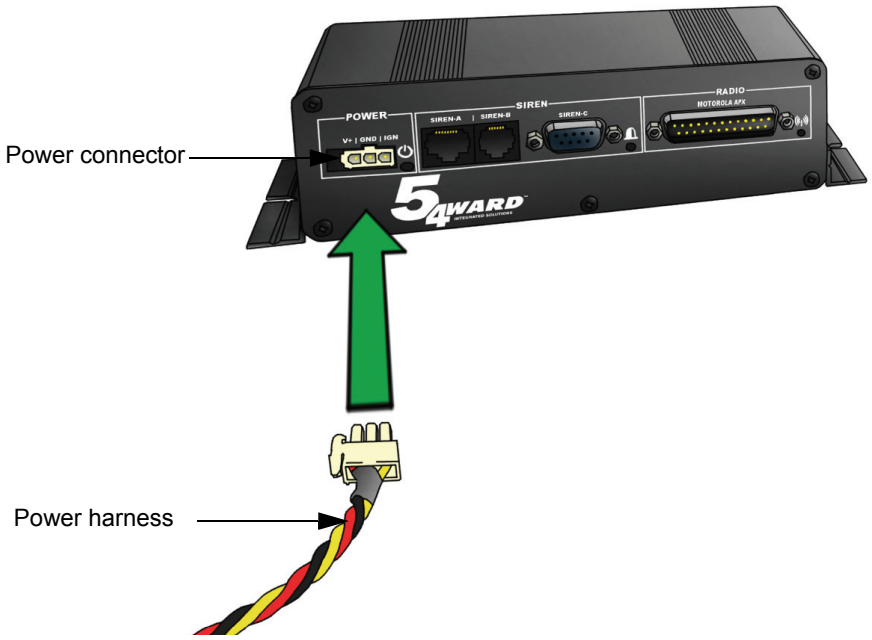
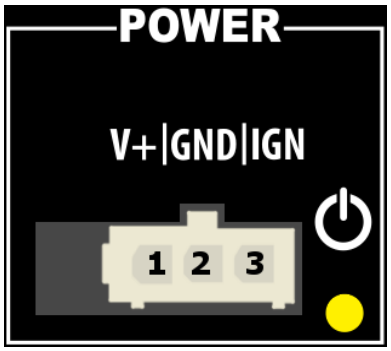


Figure 3-1. Power Connector Position

2. Using appropriately sized wire, extend the RED wire to the Positive (+) battery terminal. Fuse independently @ 2 Amps.

Table 3-1 Wiring Diagram



Pin	Function	Wire Color
1	Power	Red
2	Ground	Black
3	Ignition	Yellow

3. Using appropriately sized wire, extend the BLACK wire to the vehicle's chassis ground (typically adjacent to the battery).

4. Connect the YELLOW wire to the ignition switch to allow the Module to be turned on/off with the ignition switch.
5. Plug the connector into the 'POWER' port on the Module and verify the power LED illuminates indicating the power harness is installed correctly.
6. After the power harness wiring is verified, disconnect power from the Module and complete ALL other connections to the radio and siren before reconnecting power.

3.4.3 Radio Connection

1. Locate the Motorola Radio to Module cable (Motorola part# TT05922AA).

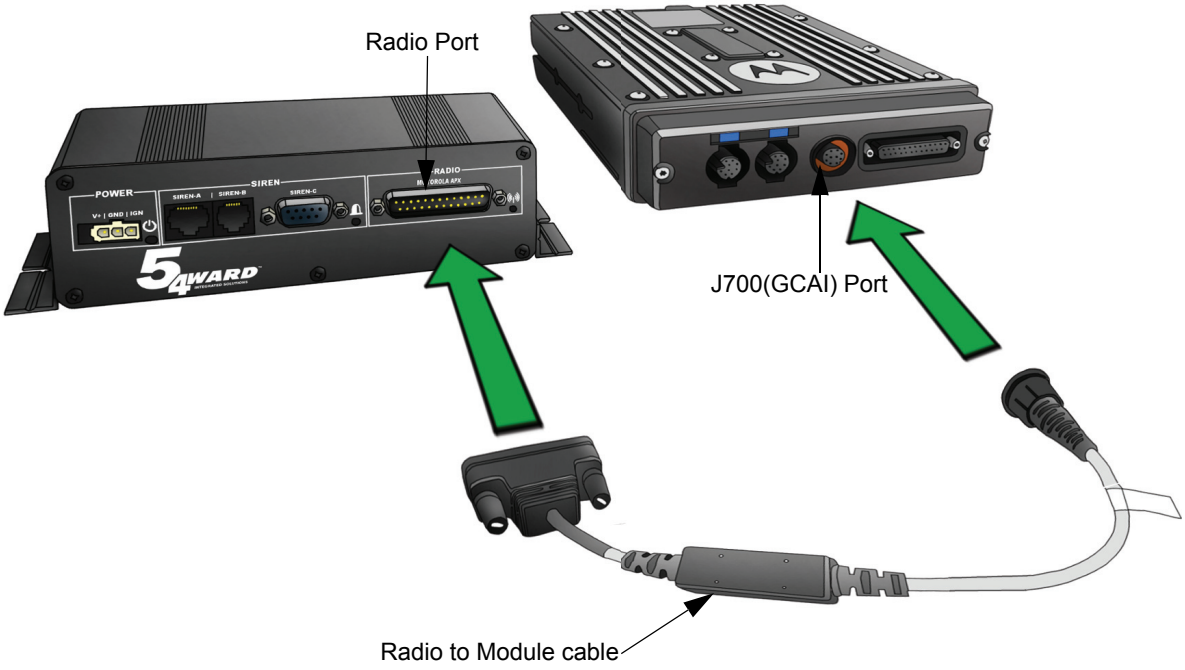


Figure 3-2. Connecting the Module to APX mobile radio

2. Connect the GCAI connector to the J700(GCAI) port on the APX mobile radio.
3. Connect the DB25 connector to the ‘RADIO’ port on the Module.
4. If needed the cable can be extended with a GCAI extension cable.

Using a DB25 extension cable will degrade the signal and can cause loss of, or intermittent communication. It is strongly recommended to use only a Motorola supplied GCAI extension cable.

3.4.4 Light and Siren Controller Connection

The Module acts as a remote control to third party light and siren controllers. The light and siren controller should be installed according to the original manufacturer's instructions. Configure the unit and test all functionality with the original manufacturer's control head and PA microphone. Radio Rebroadcast and Horn Ring Transfer (if used) should be installed according to the original manufacturer's instructions.

1. See chart in Appendix A: Ordering Information for supported light and siren controllers, associated interface cables and siren specific install instructions.

Using the wrong interface cables could cause permanent damage to the Module and connected devices.

2. Locate the appropriate interface kit for the particular light and siren controller. Refer to Appendix A: Ordering Information for the proper kit and part numbers.
3. Connect the Data Cable to the Module and siren. For more details refer to Section Chapter 4: "Device Specific Installation" on page 4-1.
4. Connect the Audio Cable to the Module and siren. For more details refer to Section Chapter 4: "Device Specific Installation" on page 4-1.

IMPORTANT-> Do not connect more than one light and siren controller to the Module.

3.4.5 General Purpose Inputs & Outputs (GPIO)

The general purpose I/O port can be used for ground-activated interaction with connected devices such as OEM steering wheel buttons for certain compatible vehicles.

Inputs:

The Module has four programmable ground-activated inputs. OEM Steering wheel buttons or similar devices may be connected to these inputs.

GROUND (0 volts) is recognized to be an ACTIVATED input.

FLOATING is recognized to be a NON-ACTIVATED input.

NOTE GPIO pins should never be connected to BATT+ voltage. The pins are not compatible with the vehicle's alternator and voltage system. If needed, non-activated inputs can be pulled weakly to 5-12V regulated DC.

Outputs:

The Module has four programmable ground-activated outputs. Low current controlled devices may be connected to these outputs.

GROUND (0 volts) is supplied when the output is ACTIVATED.

FLOAT/OPEN is supplied when the output is NON-ACTIVATED.

WARNING

Only use with low current, ground-activated controlled devices. Max Current sink is 100 mA.

1. Locate the GPIO Harness (Motorola Part# TT05888AA)

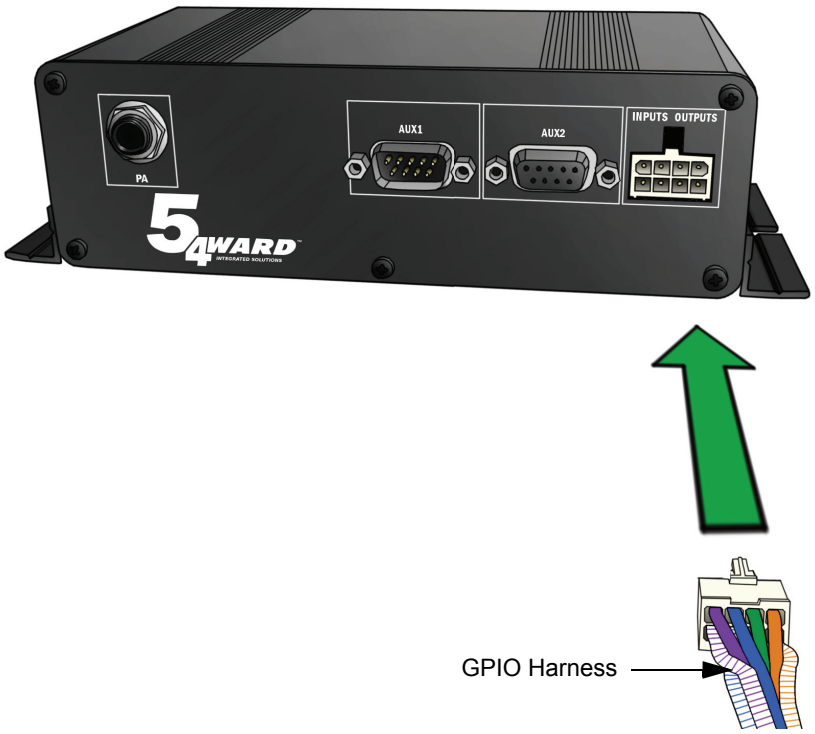


Figure 3-3. GPIO Harness Connection

2. Using appropriately sized wire, extend the input/output wires to external controls (pinout provided)

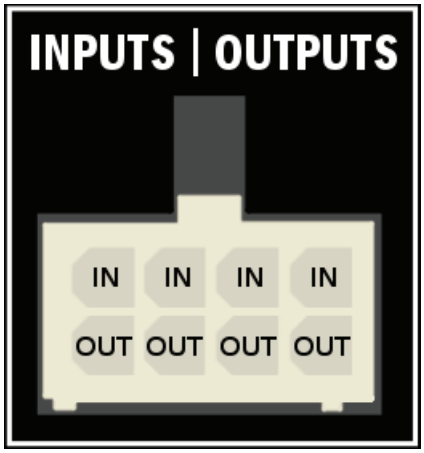


Figure 3-4. GPIO Connector Functions

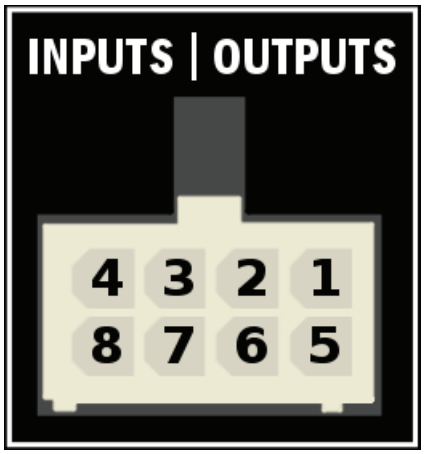


Figure 3-5. GPIO Connector Pinout

3. Properly terminate all unused input/output wires.

4. The function of the input/outputs is set in the Siren and Lights Interface Module Configuration software utility.

Table 3-2 Pinout Description Table

Side 1 - Pinout	Description	Color
Pin #1	Input #1	Orange
Pin #2	Input #2	Green
Pin #3	Input #3	Blue
Pin #4	Input #4	Purple
Pin #5	Output #1	Orange Striped
Pin #6	Output #2	Green Striped
Pin #7	Output #3	Blue Striped
Pin #8	Output #4	Purple Striped

Chapter 4 Device Specific Installation

4.1 Installation Overview

This document provides the necessary information to safely, and properly install the product. Before continuing with installation, be sure to read this manual completely. It contains important information that could prevent damage to equipment or serious injury.

Sirens output audio at extremely loud amplitudes. Exposure to extreme volume audio without adequate hearing protection can cause pain and/or hearing loss. The Occupational Safety & Health Administration organization (www.osha.gov) provides information to determine safe exposure limits for work environments. Until you have determined the safe exposure times for your specific application, anyone in the immediate vicinity should be required to wear an approved hearing protection device. Failure to comply with this warning could result in serious injury, damage to or loss of hearing.

• The installation technician should have experience working with automotive electronics and general knowledge of safety procedures related to such systems..

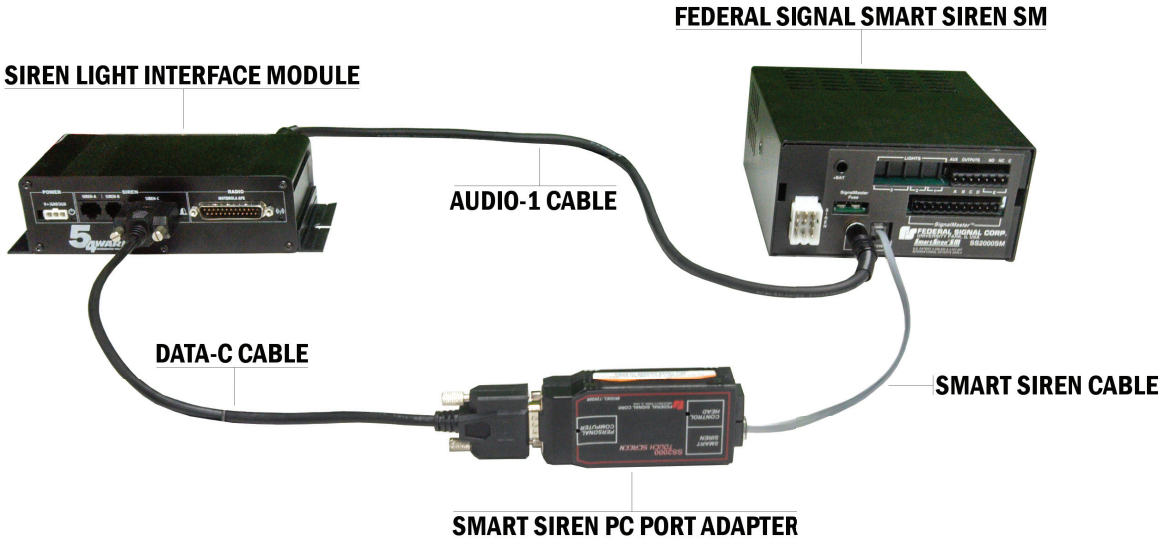
• If a butt connector or splice may be exposed to moisture then waterproof connectors must be utilized.

• Failure to follow the installation procedure will void the product warranty.

• If installation of this product requires holes to be drilled, the technician must check both sides of the surface to be drilled to ensure there are no sensitive vehicle components, electrical wires, or fluid lines near the proposed drilling location. Holes and edges must have burs removed prior to installation. If wire or cables are to be run through any drilled hole then a grommet must be used for protection from sharp or rough surfaces.

• The product and associated wires, cables, or accessories must not be installed in the deployment area of any vehicle air bags. Improper installation may prevent proper functionality of the air bag deployment or result in the product becoming a projectile. Failure to follow this instruction may result in serious injury. The installation technician assumes full responsibility in determining a safe mounting location. Refer to your vehicle owner’s manual for the air bag deployment area.

4.2 Federal Signal Smart Siren SM



4.2.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with a Federal Signal Smart Siren SM requires interface kit IK-C1. Customers who have not already purchased a Smart Siren PC port adapter from Federal Signal may choose to have one included in their interface kit by purchasing version IK-C1F which will include the OEM adapter. The Smart Siren PC port adapter will connect to the Smart Siren amplifier using a standard Smart Siren serial cable. One side of the cable will connect to the Smart Siren amplifier port labeled KEYPAD and the other end will connect to the adapter port labeled SMART SIREN.

Interface Kits:

Kit Name	Part Number	Contents
IK-C1	TT05892AA	DATA-C cable, Audio-1 cable
IK-C1F	TT05925AA	DATA-C cable, Audio-1 cable, Smart Siren PC Port Adapter

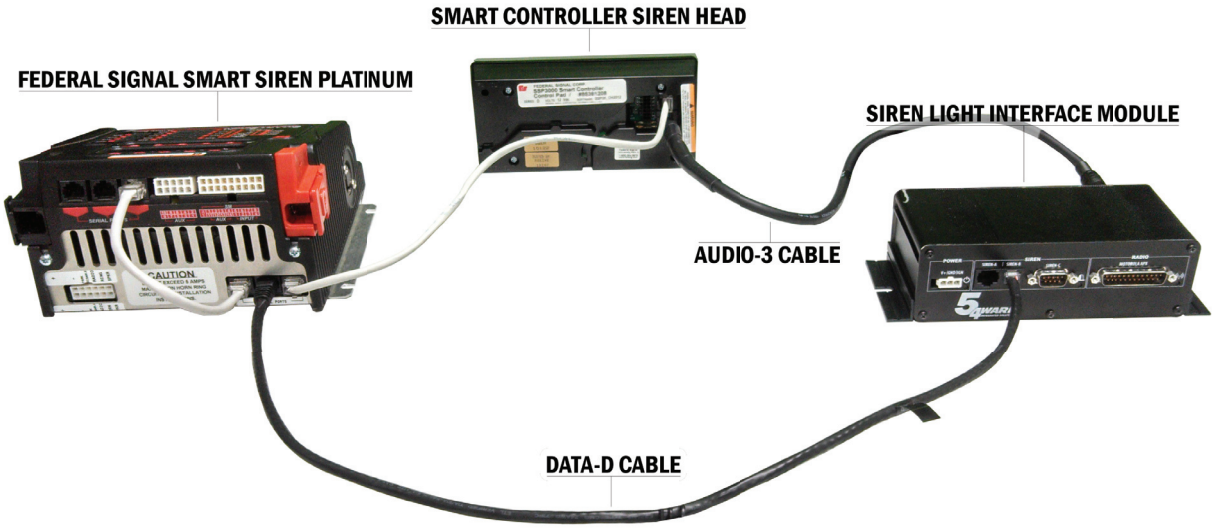
4.2.2 Data Connection

The DATA-C cable provided in interface kit IK-C1 allows the Siren and Light Interface Module to communicate with the siren. Connect the DB9 Female side of the DATA-C cable to the Siren and Light Interface Module port labeled SIREN-C. Connect the DB9 Male side of the DATA-C cable to the Smart Siren PC port adapter labeled PERSONAL COMPUTER

4.2.3 Audio Connection

The AUDIO-1 cable provided in interface kit IK-C1 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect one side of the AUDIO-1 cable to the Siren and Light Interface Module port labeled PA. Connect the other side of the AUDIO-1 cable to the Smart Siren amplifier port labeled MIC

4.3 Federal Signal Platinum



4.3.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with a Federal Signal Platinum requires interface kit IK-D3. The Platinum siren is already compatible with the Siren and Light Interface Module and does not need any additional OEM adapters. Note that the Platinum siren amplifier has multiple data ports labeled SERIAL PORTS including a built-in breakout hub. The ports are identical when installed according to the OEM siren installation instructions and can be used interchangeably.

Interface Kits:

Kit Name	Part Number	Contents
IK-D3	TT05893AA	DATA-D cable, Audio-3 cable

4.3.2 Data Connection

The DATA-D cable provided in interface kit IK-D3 allows the Siren and Light Interface Module to communicate with the siren. Connect the RJ11 side of the DATA-E cable to the Siren and Light Interface Module port labeled SIREN-B. Connect the RJ45 side of the DATA-E cable to the Platinum siren amplifier port labeled SERIAL PORTS.

WARNING

The smaller RJ11 end of the DATA-D cable should not be plugged into the larger SIREN-A port where it might loosely (though incorrectly) fit. The DATA-D cable should only be connected to the Siren and Light Interface Module port labeled SIREN-B.

WARNING

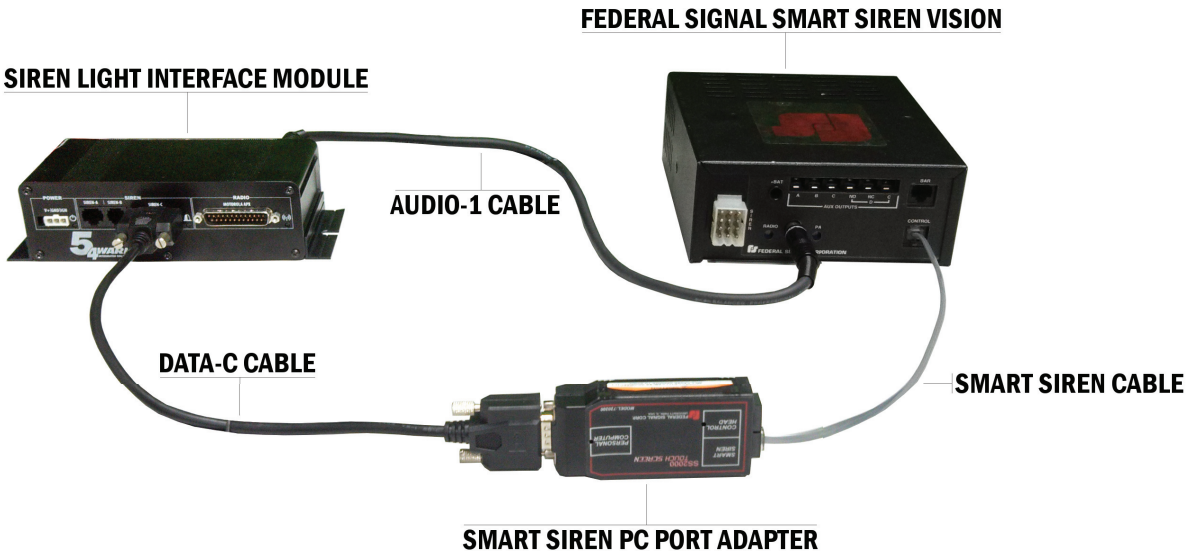
The Siren and Light Interface Module port labeled SIREN-A should never be used to connect to a Platinum siren or damage to one or both devices might occur.

4.3.3 Audio Connection

The AUDIO-3 cable provided in interface kit IK-D3 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect the ¼" headphone side of the AUDIO-3 cable to the Siren and Light Interface Module port labeled PA Connect the RJ11 side of the AUDIO-3 cable to the Smart Controller port labeled MIC located on the rear of the control head.

The RJ11 end of the AUDIO-3 cable should not be plugged into the Platinum siren amplifier.

4.4 Federal Signal Vision



4.4.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with a Federal Vision requires interface kit IK-C1. Customers who have not already purchased a Smart Siren PC port adapter from Federal Signal may choose to have one included in their interface kit by purchasing version IK-C1F which will include the OEM adapter. The Smart Siren PC port adapter will connect to the Vision amplifier using a standard Smart Siren serial cable. One side of the cable will connect to the Vision amplifier port labeled CONTROL and the other end will connect to the adapter port labeled SMART SIREN.

Interface Kits:

Kit Name	Part Number	Contents
IK-C1	TT05892AA	DATA-C cable, Audio-1 cable
IK-C1F	TT05925AA	DATA-C cable, Audio-1 cable, Smart Siren PC Port Adapter

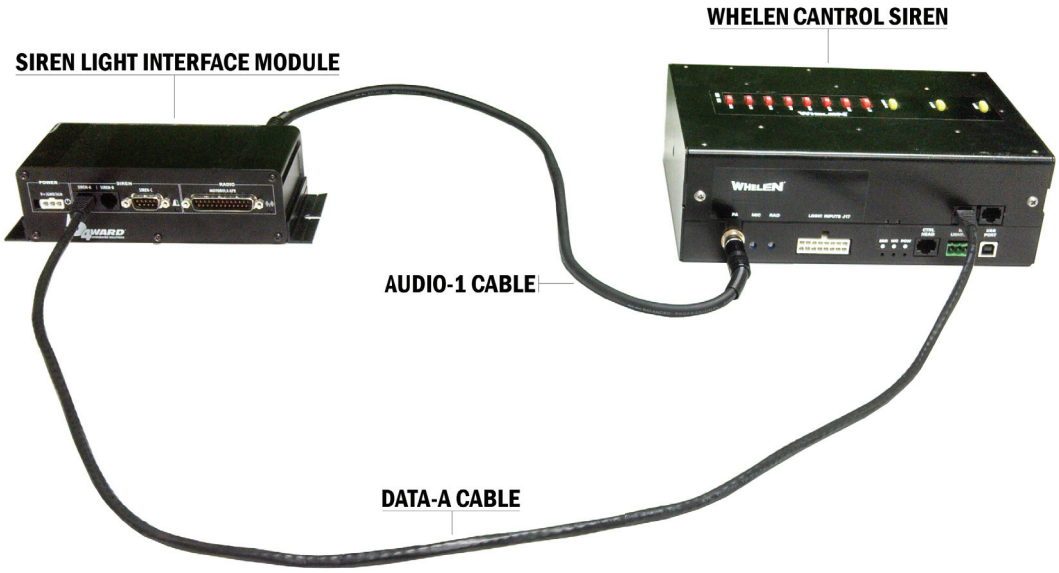
4.4.2 Data Connection

The DATA-C cable provided in interface kit IK-C1 allows the Siren and Light Interface Module to communicate with the siren. Connect the DB9 Female side of the DATA-C cable to the Siren and Light Interface Module port labeled SIREN-C. Connect the DB9 Male side of the DATA-C cable to the Smart Siren PC port adapter labeled PERSONAL COMPUTER.

4.4.3 Audio Connection

The AUDIO-1 cable provided in interface kit IK-C1 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect one side of the AUDIO-1 cable to the Siren and Light Interface Module port labeled PA. Connect the other side of the AUDIO-1 cable to the Vision amplifier port labeled MIC.

4.5 Whelen CANTROL



4.5.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with a Cantrol siren requires interface kit IK-A1. Customers who have not already purchased a 2-port internal expansion board from Whelen may choose to have one included in their interface kit by purchasing version IK-A1WB which will include the OEM expansion board. The expansion board will install internal to the Cantrol amplifier and add 2 additional ports necessary for third-party communication. For more details see the following: Section 4.5.4: “Expansion Board Installation” on page 4-7.

Interface Kits:

Kit Name	Part Number	Contents
IK-A1	TT05890AA	DATA-A cable, Audio-1 cable
IK-A1WB	TT05924AA	DATA-A cable, Audio-1 cable, 2-port Internal Expansion Board

4.5.2 Data Connection

The DATA-A cable provided in interface kit IK-A1 allows the Siren and Light Interface Module to communicate with the siren. Connect the one side of the DATA-A cable to the Siren and Light Interface Module port labeled SIREN-A. Connect the other side of the DATA-A cable to the Cantrol siren amplifier port using one of the two expansion ports.

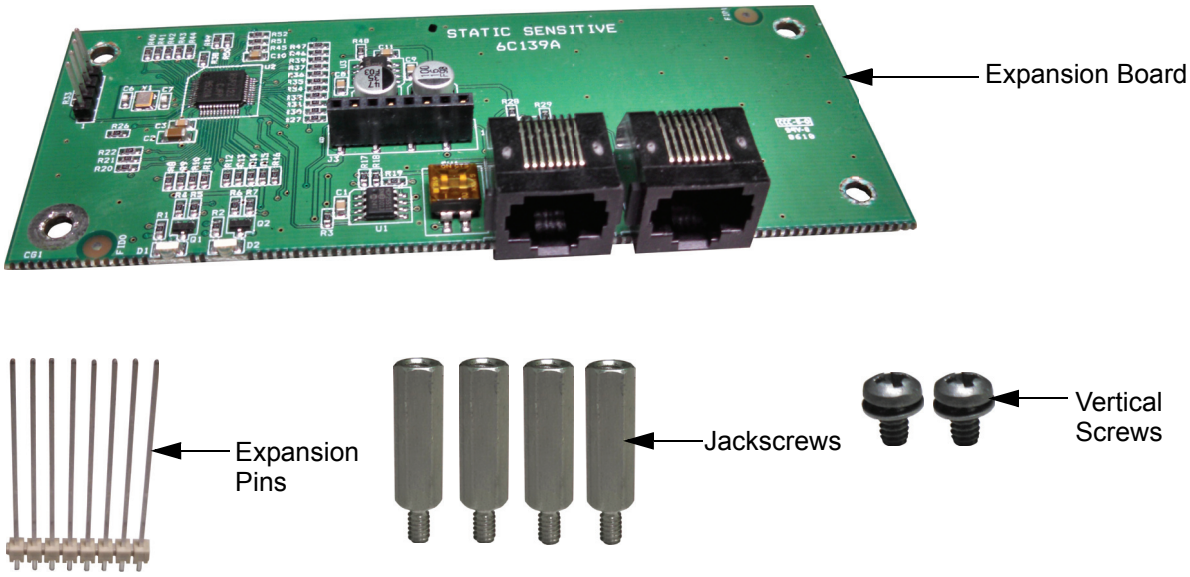
The Siren and Light Interface Module port labeled SIREN-A should never be connected to the CTRL HEAD port of the Cantrol or damage to one or both devices might occur.

4.5.3 Audio Connection

The AUDIO-1 cable provided in interface kit IK-A1 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect the one side of the AUDIO-1 cable to the Siren and Light Interface Module port labeled PA. Connect the other side of the AUDIO-1 cable to the Cantrol siren amplifier port labeled PA.

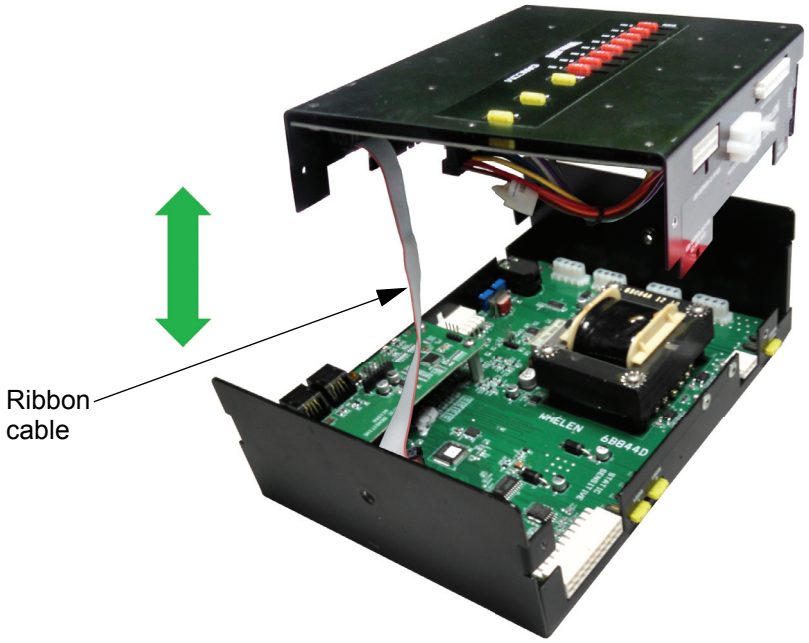
4.5.4 Expansion Board Installation

The 2-port expansion board is an add-on for the Whelen CANTROL and CENCOM SAPPHIRE sirens that allow third party communication. The expansion pack should include the expansion board, an 8-position single row of header pins, and 4 extension jackscrews or screws. The jackscrews can take the place of existing internal screws which can then be used to secure the expansion board to the extension jackscrews.

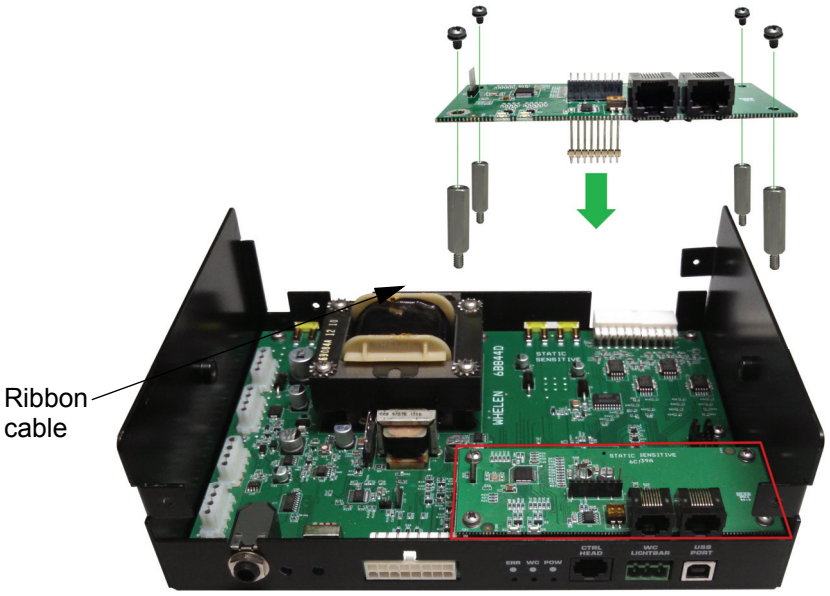


1. To begin installation we will need internal access to the siren amplifier. Remove the four screws holding the amplifier together. On the Cantrol there will be two screws on the front face and two screws on the rear face as shown in the image below.

2. Separate the enclosure by carefully pulling apart the top and bottom pieces. Note that there will be a ribbon cable connecting the two halves. This cable can be gently removed from either piece while working or left connected if the pieces are left close enough together. If the cable is removed, ensure it is reconnected with the same orientation after installing the expansion board.

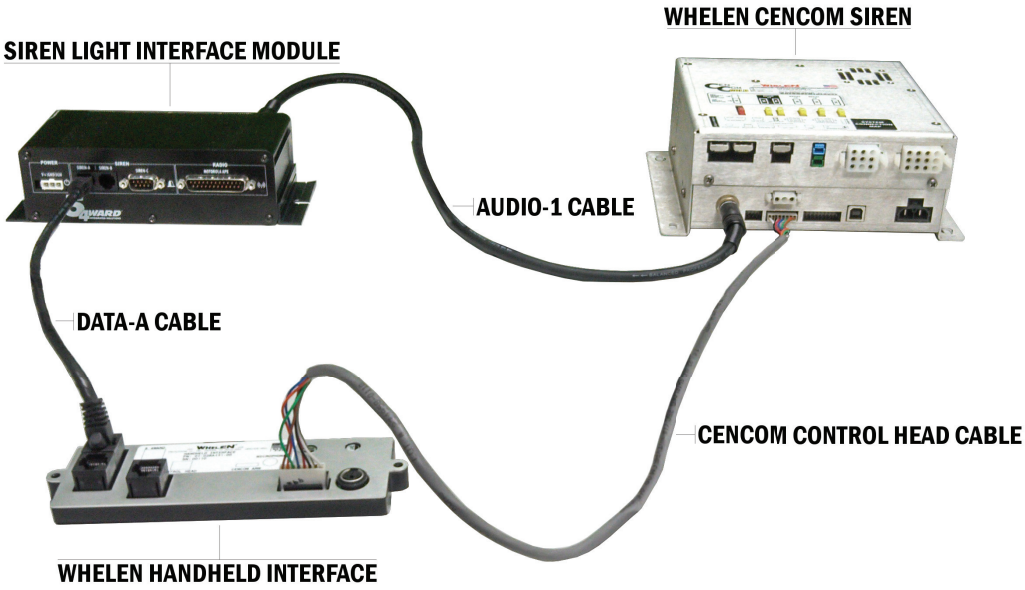


3. Once you have gained access to the bottom internal board of the amplifier, verify that extension jackscrews (spacers) are installed in the proper location. If traditional screws are currently installed then replace them with the extension jackscrews – the existing screws will then be used to secure the expansion board. See the image below for proper installation location. When installing the expansion board ensure that the short side of the 8 position header pin row is inserted into the bottom amplifier board and that the long side of the header pin row is inserted correctly through the expansion board sockets.



4. Once the header pin row and expansion board are installed correctly and secured to the amplifier, reassemble the siren enclosure. If the cable connecting the top and bottom amplifier boards was removed during installation, ensure it is reconnected. Remember to re-secure the amplifier enclosure together using the two front and two rear external screws.

4.6 Whelen CENCOM



4.6.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with a Cencom siren requires interface kit IK-A1 as well as a Whelen Handheld Interface adapter. Customers who have not already purchased a Handheld Interface adapter from Whelen may choose to have one included in their interface kit by purchasing version IK-A1WA which will include the OEM adapter. The Handheld Interface adapter will plug into the siren amplifier port labeled CONTROL HD using the Cencom control head cable. The adapter contains two expansion ports for third-party communication and an additional control head port.

Interface Kits:

Kit Name	Part Number	Contents
IK-A1	TT05890AA	DATA-A cable, Audio-1 cable
IK-A1WA	TT05923AA	DATA-A cable, Audio-1 cable, Whelen Handheld Interface Adapter

4.6.2 Data

The DATA-A cable provided in interface kit IK-A1 allows the Siren and Light Interface Module to communicate with the siren. Connect one side of the DATA-A cable to the Siren and Light Interface Module port labeled SIREN-C. Connect the other side of the DATA-A cable to one of the Handheld Interface adapter ports labeled 54WARD.

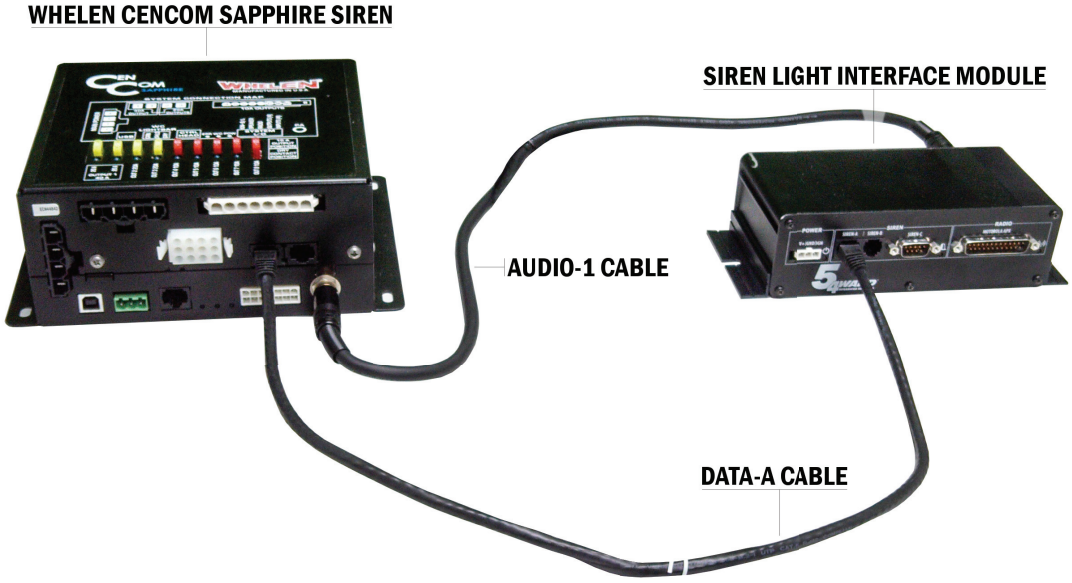
WARNING

The Siren and Light Interface Module port labeled SIREN-A should never be connected to the CTRL HEAD port of the Whelen Handheld Interface adapter or damage to one or both devices might occur.

4.6.3 Audio

The AUDIO-1 cable provided in interface kit IK-A1 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect one side of the AUDIO-1 cable to the Siren and Light Interface Module port labeled PA. Connect the other side of the AUDIO-1 cable to the Cencom siren amplifier port labeled MICROPHONE.

4.7 Whelen CENCOM Sapphire



4.7.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with a Cencom Sapphire siren requires interface kit IK-A1. Customers who have not already purchased a 2-port internal expansion board from Whelen may choose to have one included in their interface kit by purchasing version IK-A1WB which will include the OEM expansion board. The expansion board will install inside the Sapphire amplifier and add 2 additional ports necessary for third-party communication.

Interface Kits:

Kit Name	Part Number	Contents
IK-A1	TT05890AA	DATA-A cable, Audio-1 cable
IK-A1WB	TT05924AA	DATA-A cable, Audio-1 cable, 2-port Internal Expansion Board

4.7.2 Data Connection

The DATA-A cable provided in interface kit IK-A1 allows the Siren and Light Interface Module to communicate with the siren. Connect the one side of the DATA-A cable to the Siren and Light Interface Module port labeled SIREN-A. Connect the other side of the DATA-A cable to the Sapphire siren amplifier port using one of the two expansion ports.

WARNING

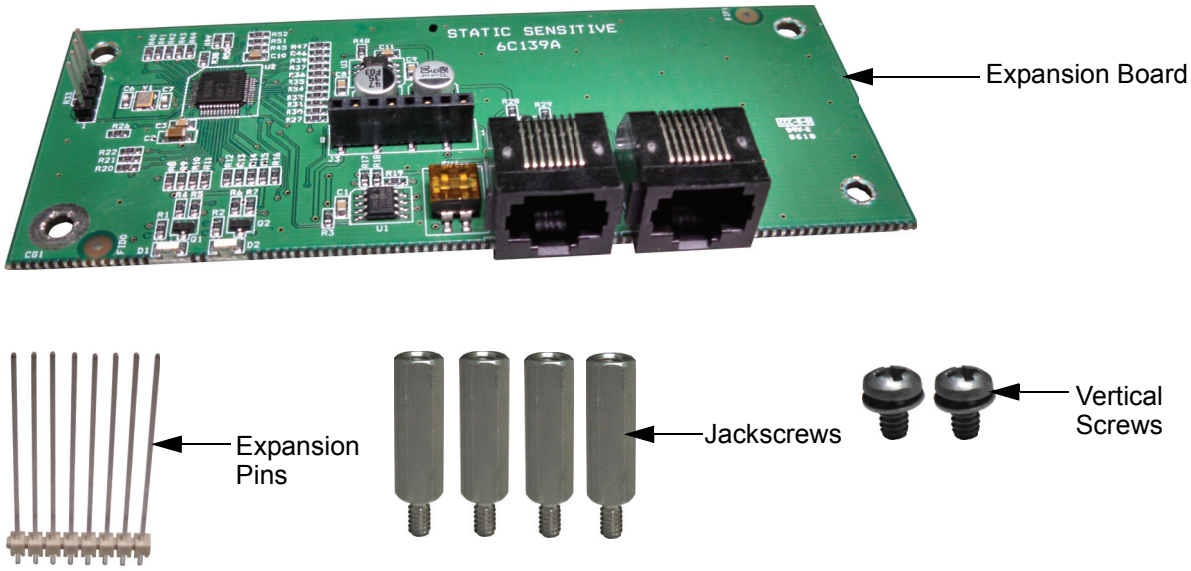
The Siren and Light Interface Module port labeled SIREN-A should never be connected to the CTRL HEAD ports of the Sapphire or damage to one or both devices might occur.

4.7.3 Audio Connection

The AUDIO-1 cable provided in interface kit IK-A1 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect the one side of the AUDIO-1 cable to the Siren and Light Interface Module port labeled PA. Connect the other side of the AUDIO-1 cable to the Sapphire siren amplifier port labeled PA.

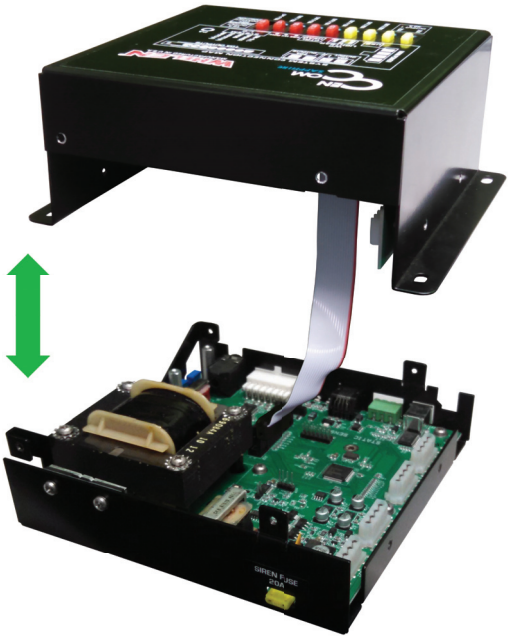
4.7.4 Expansion Board Installation

The 2-port expansion board is an add-on for the Whelen CANTROL and CENCOM SAPPHIRE sirens that allow third party communication. The expansion pack should include the expansion board, an 8-position single row of header pins, and 4 extension jackscrews or screws. The jackscrews can take the place of existing internal screws which can then be used to secure the expansion board to the extension jackscrews.

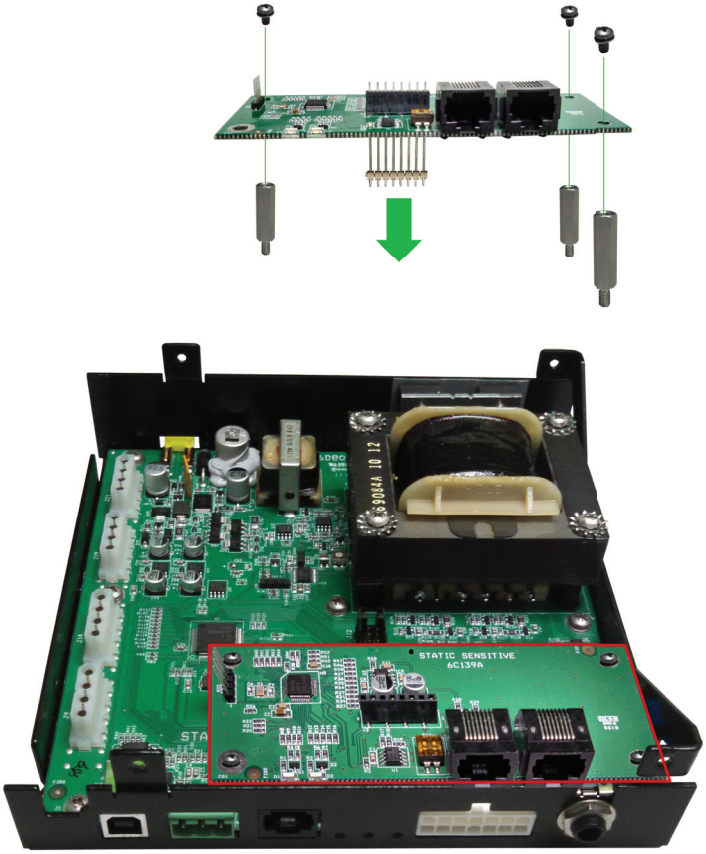


1. To begin installation we will need internal access to the siren amplifier. Remove the four screws holding the amplifier together. On the Sapphire there will be two screws on each of the front, rear, left, and right faces as shown in the image below.

2. Separate the enclosure by carefully pulling apart the top and bottom pieces. Note that there will be a ribbon cable connecting the two halves. This cable can be gently removed from either piece while working or left connected if the pieces are left close enough together. If the cable is removed, ensure it is reconnected with the same orientation after installing the expansion board.

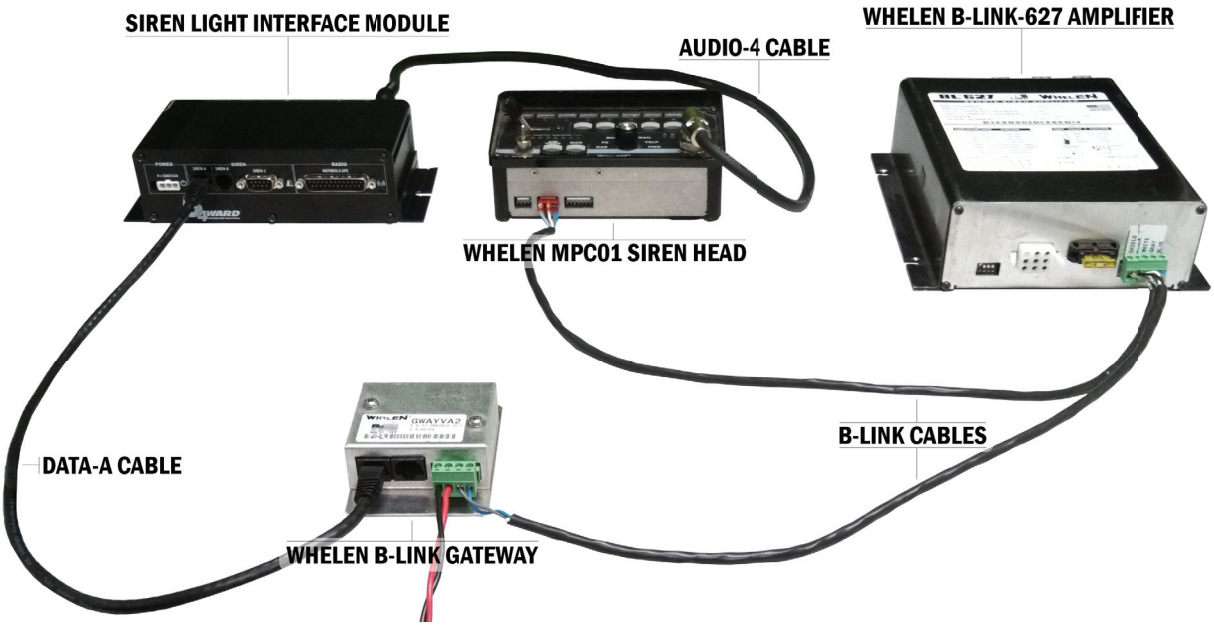


3. Once you have gained access to the bottom internal board of the amplifier, verify that extension jackscrews (spacers) are installed in the proper location. If traditional screws are currently installed then replace them with the extension jackscrews – the existing screws will then be used to secure the expansion board. See the image below for proper installation location. When installing the expansion board ensure that the short side of the 8 position header pin row is inserted into the bottom amplifier board and that the long side of the header pin row is inserted correctly through the expansion board sockets.



4. Once the header pin row and expansion board are installed correctly and secured to the amplifier, reassemble the siren enclosure. If the cable connecting the top and bottom amplifier boards was removed during installation, ensure it is reconnected. Remember to re-secure the amplifier enclosure together using the six external screws.

4.8 Whelen MPC01



4.8.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with an MPC01 requires interface kit IK-A4 as well as a Whelen B-Link Gateway. Customers who have not already purchased a B-Link Gateway from Whelen may choose to have one included in their interface kit by purchasing version IK-A4WC which will include the OEM adapter. The B-Link Gateway will connect to the BL627 amplifier using a standard blue/grey B-Link data connection. Note that the B-Link gateway will only use the standard blue/grey data wires and will not connect to the B-Link audio wires. Instead, the Gateway will require power to its additional pins. For more information see Section 4.8.4: "Gateway Installation" on page 4-17.

Interface Kits:

Kit Name	Part Number	Contents
IK-A4	TT05891AA	DATA-A cable, Audio-4 cable
IK-A4WC	TT05939AA	DATA-A cable, Audio-4 cable, Whelen B-Link Gateway

4.8.2 Data Connection

The DATA-A cable provided in interface kit IK-A4 allows the Siren and Light Interface Module to communicate with the siren. Connect one side of the DATA-A cable to the Siren and Light Interface Module port labeled SIREN-A. Connect the other side of the DATA-A cable to one of the Gateway's expansion ports.

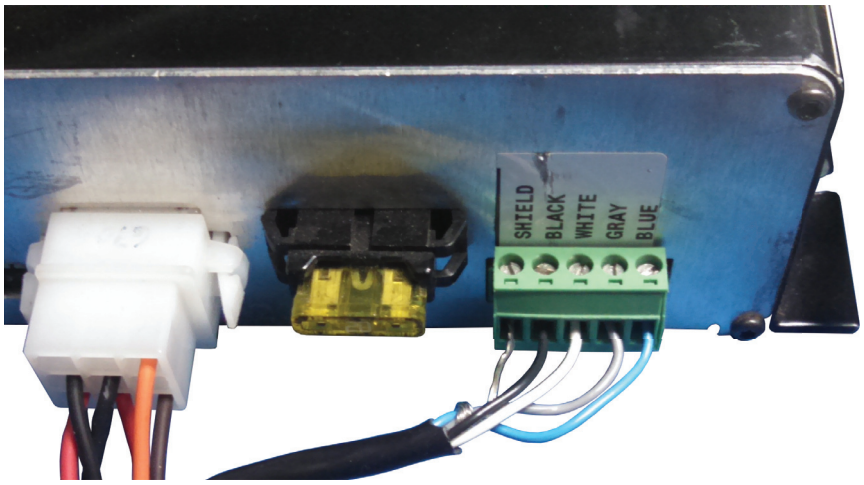
4.8.3 Audio Connection

The AUDIO-4 cable provided in interface kit IK-A4 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect the ¼" headphone side of the AUDIO-4 cable to the Siren and Light Interface Module port labeled PA. Connect the 4-pin CB Mic side of the AUDIO-1 cable to the MPC01 control head 4-pin CB microphone port.

4.8.4 Gateway Installation

Unlike the connection between the control head and the BL-627 amplifier which uses a 4 conductor plus drain wire cable, the Gateway connects to the B-Link network using only a 2 conductor cable. In addition, the Gateway also requires a direct power connection. Once the Gateway is powered and connected to the B-Link blue & gray data wires it is ready for third-party connections. Example images and pinout information can be seen in the images and tables below.

B-Link Gateway		
Pinout	**Color**	**Description**
1	Blue	A-Bus, RS-485
2	Gray	B-Bus, RS-485
3	Red	BATT+
4	Black	GROUND

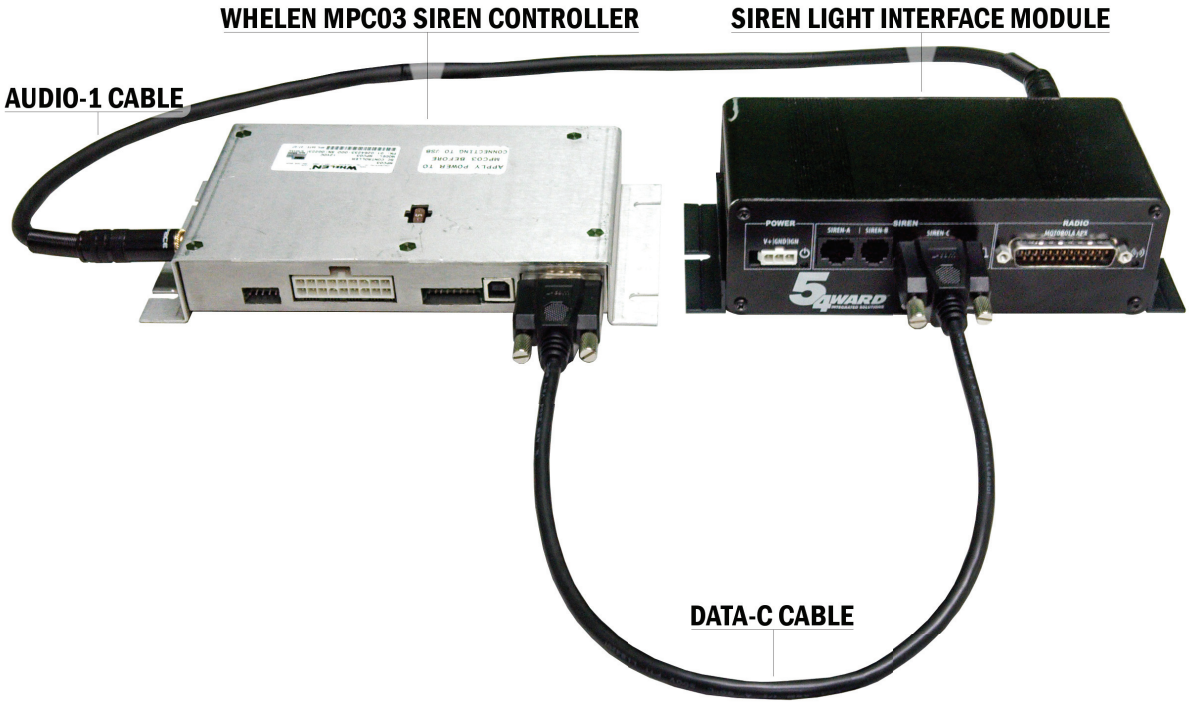


BL-627 Amplifier		
Pinout	**Color**	**Description**
1	Blue	A-Bus, RS-485
2	Gray	B-Bus, RS-485
3	White	AUDIO+ (PLUS)
4	Black	AUDIO- (MINUS)
5	Drain	SHIELD

Caution

B-Link audio wires should not be connected to the B-Link Gateway.

4.9 Whelen MPC03



4.9.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with an MPC03 requires interface kit IK-C1. The MPC03 is already compatible with the Siren and Light Interface Module and does not need any additional OEM adapter.

Interface Kits:

Kit Name	Part Number	Contents
IK-C1	TT05892AA	DATA-C cable, Audio-1 cable

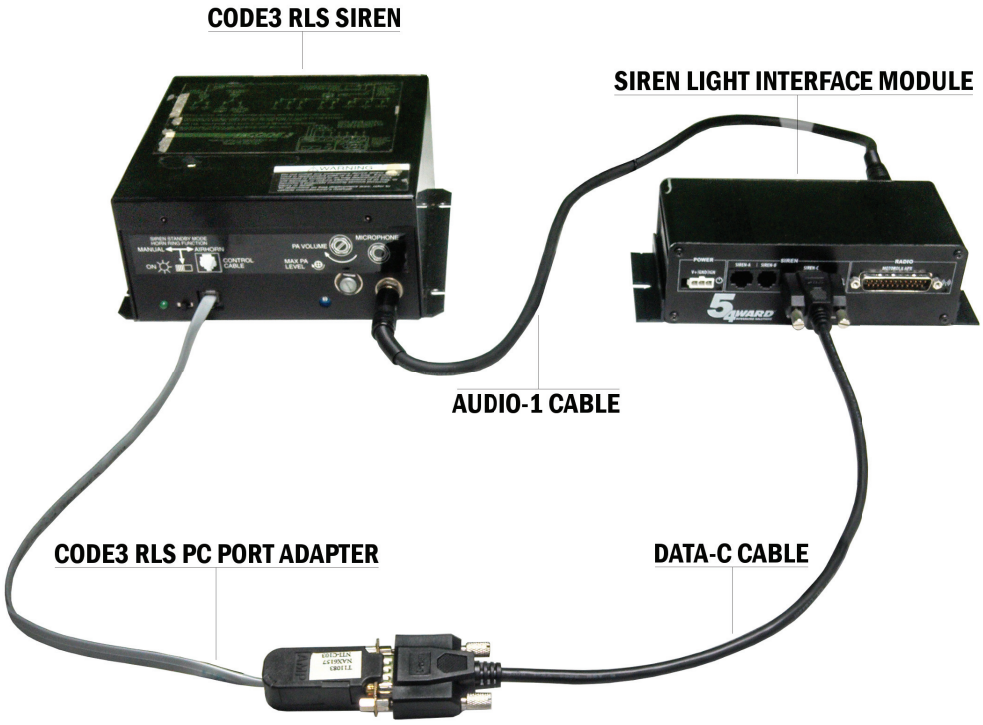
4.9.2 Data Connection

The DATA-C cable provided in interface kit IK-C1 allows the Siren and Light Interface Module to communicate with the siren. Connect the DB9 Female side of the DATA-C cable to the Siren and Light Interface Module port labeled SIREN-C. Connect the DB9 Male side of the DATA-C cable to the MPC03 Siren Controller port labeled SERIAL.

4.9.3 Audio Connection

The AUDIO-1 cable provided in interface kit IK-C1 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect the one side of the AUDIO-1 cable to the Siren and Light Interface Module port labeled PA. Connect the other side of the AUDIO-1 cable to the MPC03 Siren Controller port labeled MICROPHONE.

4.10 CODE3 RLS



4.10.1 Siren Pre-Installation

Installation of the Siren and Light Interface Module with a Code3 RLS siren requires interface kit IK-C1 as well as a Code3 RLS PC port adapter. Customers who have not already purchased an RLS PC port adapter from Code3 may choose to have one included in their interface kit by purchasing version IK-C1C which will include the OEM adapter. One end of the RLS PC port adapter will plug into the siren amplifier port labeled CONTROL CABLE in place of the OEM control head, while the other end of the adapter is free to connect to an external device. Note: an external breakout hub can be used to allow multiple devices access to the amplifier port labeled CONTROL CABLE. If needed, the breakout hub is provided by Code3.

Interface Kits:

Kit Name	Part Number	Contents
IK-C1	TT05892AA	DATA-C cable, Audio-1 cable
IK-C1C	TT05926AA	DATA-C cable, Audio-1 cable, Code3 RLS PC Port Adapter

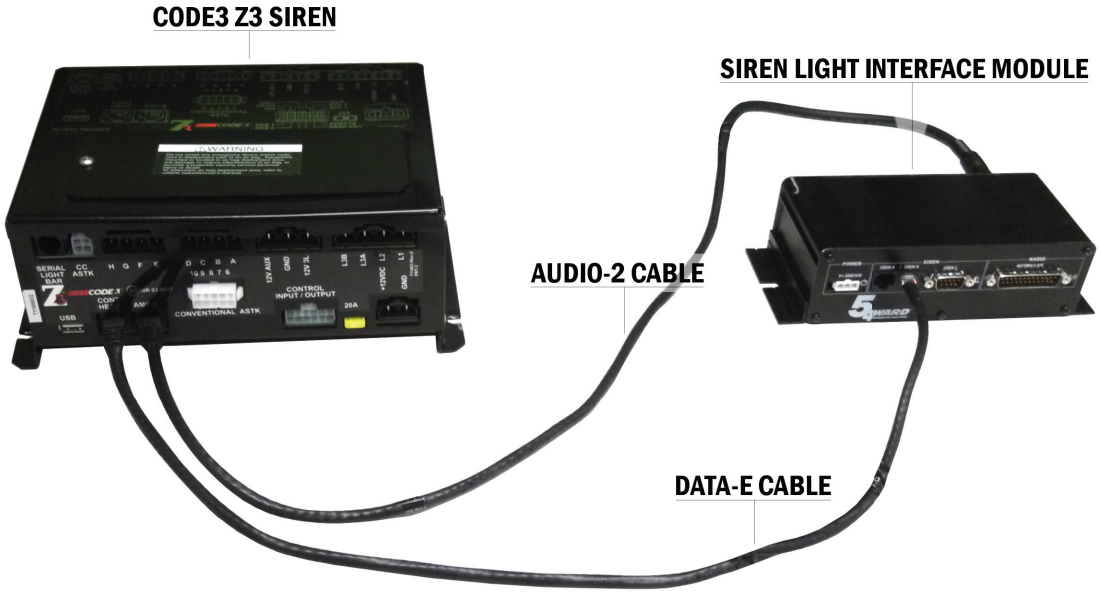
4.10.2 Data Connection

The DATA-C cable provided in interface kit IK-C1 allows the Siren and Light Interface Module to communicate with the siren. Connect the DB9 Female side of the DATA-C cable to the Siren and Light Interface Module port labeled SIREN-C. Connect the DB9 Male side of the DATA-C cable to the RLS PC port adapter.

4.10.3 Audio Connection

The AUDIO-1 cable provided in interface kit IK-C1 allows the Siren and Light Interface Module to bring Public Address audio to the siren. Connect one side of the AUDIO-1 cable to the Siren and Light Interface Module port labeled PA. Connect the other side of the AUDIO-1 cable to the RLS siren amplifier port labeled MICROPHONE.

4.11 CODE3 Z3



4.11.1 Siren Pre-Installation

The Z3 Siren is already compatible with the Siren Light Interface Module. Note that the two data ports CTRL HEAD and AMP2 are identical and either can be used interchangeably. If additional ports are needed, a breakout hub can be provided by Code3.

4.11.2 Data Connection

Z3 installation requires a Data-E cable provided by Motorola Solutions (Included in kit IK-E2 Part # TT05894AA). Connect the RJ11 side of the Data-E cable to the SIREN-B port of the Siren Light Interface Module. Connect the RJ45 side of the Data-E cable to the CTRL HEAD port of the Z3 Siren.

WARNING

DO NOT connect the SIREN-A port to the CTRL HEAD or AMP2 port of the Z3 Siren.

WARNING

DO NOT connect the DATA-E cable to the SIREN-A port of the Siren Light Interface Module.

4.11.3 Audio Connection

Z3 installation requires an Audio-2 cable provided by Motorola Solutions (Included in kit IK-E2 Part # TT05894AA). Connect the ¼” Headphone side of the Audio-2 cable to the PA port of the Siren Light Interface Module. Connect the RJ45 side of the Audio-2 cable to the AMP2 port of the Z3 Siren.

Notes

Chapter 5 Best Practices: Installation & Troubleshooting

In this section are Motorola recommended vehicle installation practices that can address or prevent many issues.

5.1 Check Wiring of Ignition Sensing

- If it is required to turn the Module on and off via the ignition sense switch, connect the ignition sense lead to the accessory terminal from the ignition switch (usually in the vehicle's fuse panel under accessory or radio).

NOTE: Motorola recommends protecting or isolating the Module's ignition sense input from voltage spikes in excess of +/- 40VDC. Such spikes can be hundreds of volts in amplitude and are common in larger vehicles (utility trucks, buses and etc.), especially when the source is common to a solenoid coil. A triggerable oscilloscope is required to determine the existence of such spikes as most voltmeters cannot measure in short duration (< 1 msec). If the condition of the intended ignition sense source is unknown, Motorola recommends isolating the source from the Module with a relay or the use of a suppression diode wired between the source and ground. Any high current suppression diode (i.e. MR2535) with a breakdown voltage of between 18 and 40 volts will suffice. A suitable diode kit is available from Motorola parts, kit number HLN6325_.

- If it is required to have the radio power up only via the control head's on/off switch, then connect the ignition sense lead directly to the positive terminal of the battery. This will mean the ignition sense will always be ignored and a re-wiring will be necessary in the future if the operator chooses any ignition sense CPS setting.

5.2 Check Physical Installation of Module Ground and Connected Device's Wiring

- Take care to scrape away paint on the chassis at the place where the ground connection is to be made, and try to keep the ground lead as short as possible.
- Verify that the BATT+ lead (red) is connected directly to the positive terminal of the battery and the ground lead (black) is connected to the vehicle's chassis using as short of a length of wire as is practical.
- For vehicles that have other types of electronic equipment installed (lights, flashers, computers siren/PA and etc.), use a separate ground for the Module.
- Make sure that the mobile radio antenna is the minimum required distance (three feet) from all devices to prevent radio frequency interference (RFI) from interfering with the Module or connected devices.

5.3 Jump-Start the Vehicle

Caution

Do not jump-start vehicle with Module power or ignition sense cables connected. Damage to the Module and/or accessories may result.

Jump-starting a vehicle can crank **300+ volts** through the vehicle's charging system and these transients can damage electrical equipment.

The state of your radio prior to needing a jump-start may be unknown, and the radio may attempt to return to its last state (radio ON), when doing a jump-start. Therefore, Motorola recommends the following steps be taken before jump-starting any vehicle containing a radio.

1. Locate the ignition sense line (thin yellow wire or thin red wire, depending on dash mount or remote mount installation) and the main power leads (thick red wire) near the battery positive terminal.

NOTE: These lines are fused. In the event these lines are not fused (add the appropriate fuse in line) use whatever tools necessary to physically disconnect the ignition sense and power lines from the battery terminal.

Make sure that the disconnected lines are not in the way of moving parts or interfering with the vehicle operation in any way.

2. Open up the fuse holders and remove the fuses out of the kits.
3. Re-tighten the fuse holders but without the fuses to insure that ignition sense and power lines do not interfere with moving parts.
4. Proceed with the jump-start routine as described by your vehicle owner's manual.
5. Once the jump-start process is complete, re-install the fuses into their holders.

Appendix A Ordering Information

A.1 Replacement Parts

Model/Option	Replacement P/N	Description
TT2723A		Base Components
*	DDN1774A	Siren And Lights Interface Module
*	DDN1775A	Power Harness For Siren & Lights Interface Module
*	DDN1776A	GPIO Harness For Siren & Lights Interface Module
*	HKN6239A	Radio to Module Cable (aka ADK1.1 cable or GCAI to DB25 cable)
TT05889AA	DDN1777A	Programming Kit For Siren & Lights Interface Module (Cable+CD)
TT05890AA	DDN1778A	Interface Kit IK-A1 (DATA RJ45 TO RJ45, AUDIO TRS TO TRS)
TT05891AA	DDN1779A	Interface Kit IK-A4 (DATA RJ45 TO RJ45, AUDIO TRS TO 4PIN CB)
TT05892AA	DDN1780A	Interface Kit IK-C1 (DATA DB9 TO DB9, AUDIO TRS TO TRS)
TT05893AA	DDN1781A	Interface Kit IK-D3 (DATA RJ11 TO RJ45, AUDIO TRS TO RJ11)
TT05894AA	DDN1782A	Interface Kit IK-E2 (DATA RJ11 TO RJ45, AUDIO TRS TO RJ45)
TT05923AA	DDN1896A	Interface Kit IK-A1WA (CENCOM GOLD)
TT05924AA	DDN1897A	Interface Kit IK-A1WB (CENCOM SAPPHIRE & CANTROL)
TT05925AA	DDN1898A	Interface Kit IK-C1F (SS2000, SM, Vision, Premium Vision)
TT05926AA	DDN1899A	Interface Kit IK-C1C (RLS)
TT05939AA	DDN1937A	Interface Kit IK-A4WC (MPC01)
	PMKN4093A	Extension for Radio-to-Module Cable (21") (aka GCAI extension)
	PMUN1058A	TIB 7500/6500 Mid-Power
	PMUN1059A	TIB 7500/6500 High-Power

NOTE * Included when ordering TT2723A

A.2 Product and Device Specific

Manufacturer	Product	Interface Kit	Option Number	Device Specific Install Manual
Whelen	MPC01VAM	IK-A4	TT05891AA	Whelen MPC01
Whelen	MPC01	IK-A4WC	TT05939AA	Whelen MPC01
Whelen	MPC03	IK-C1	TT05892AA	Whelen MPC03
Whelen	CenCom Gold	IK-A1WA	TT05923AA	Whelen CENCOM
Whelen	CenCom Grey	IK-A1	TT05890AA	Whelen CENCOM
Whelen	CenCom Sapphire	IK-A1WB	TT05924AA	Whelen CENCOM Sapphire
Whelen	CanTrol	IK-A1WB	TT05924AA	Whelen CANTROL
Whelen	CanTrol WC	IK-A1WB	TT05924AA	Whelen CANTROL
Federal Signal	SmartSiren	IK-C1F	TT05925AA*	Federal Signal Smart Siren SM
Federal Signal	SmartSiren SM	IK-C1F	TT05925AA*	Federal Signal Smart Siren SM
Federal Signal	Platinum	IK-D3	TT05893AA	Federal Signal Platinum
Federal Signal	Premium Vision	IK-C1F	TT05925AA*	Federal Signal Vision
Federal Signal	Vision	IK-C1F	TT05925AA*	Federal Signal Vision
Code3	Z3	IK-E2	TT05894AA	CODE3 Z3
Code3	RLS 3997	IK-C1C	TT05926AA	CODE3 RLS
Code3	RLS 3997R	IK-C1C	TT05926AA	CODE3 RLS
Code3	RLS 3997RCC	IK-C1C	TT05926AA	CODE3 RLS
Code3	RLS 3998	IK-C1C	TT05926AA	CODE3 RLS
Code3	RLS 3998R	IK-C1C	TT05926AA	CODE3 RLS
Code3	RLS 3999	IK-C1C	TT05926AA	CODE3 RLS
Code3	RLS 3999R	IK-C1C	TT05926AA	CODE3 RLS
Code3	RLS 3996	IK-C1C	TT05926AA	CODE3 RLS
Code3	RLS 3995	IK-C1C	TT05926AA	CODE3 RLS

NOTE * Please note that these Expansion Kit orders require a minimum order quantity of above 100 units.

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